

Class 10 Mathematics: Previous Year Questions, Chapter-wise

1107 CBSE board exam questions, 2022–2026 · 14 chapters · sorted by question type

Each question shows its exam year and marks. A question repeated across paper sets appears once. Questions that need a figure from the original paper are left out. Questions only, no answers. Chapter headings link to free notes and MCQs for that chapter on studynos.co.in.

1. Real Numbers (90)
2. Polynomials (68)
3. Pair of Linear Equations in Two Variables (79)
4. Quadratic Equations (73)
5. Arithmetic Progressions (89)
6. Triangles (53)
7. Coordinate Geometry (94)
8. Introduction to Trigonometry (142)
9. Some Applications of Trigonometry (61)
10. Circles (64)
11. Areas Related to Circles (62)
12. Surface Areas and Volumes (61)
13. Statistics (74)
14. Probability (97)

1 Real Numbers

Notes & MCQs →

MULTIPLE CHOICE AND ASSERTION-REASON (53)

Q1. CBSE 2026 · 1 mark If HCF (850, 325) is 25, then LCM (850, 325) is:

- (a) 442 (b) 11050 (c) 8450 (d) 2210

Q2. CBSE 2026 · 1 mark $7 \times 29 \times 23 + 1$ is:

- (a) a prime number (b) divisible by 23 (c) an odd number
(d) a composite number

Q3. CBSE 2026 · 1 mark Assertion (A): 4^n can not end with the digit zero. Reason (R): Prime factorisation of 4^n is unique.

- (a) Both, Assertion (A) and Reason (R) are true and Reason (R) is correct explanation of Assertion (A)
(b) Both, Assertion (A) and Reason (R) are true, but Reason (R) is not correct explanation for Assertion (A)
(c) Assertion (A) is true, but Reason (R) is false
(d) Assertion (A) is false, but Reason (R) is true

Q4. CBSE 2026 · 1 mark Probability of getting an irrational number at random from the numbers 3, 4, $\sqrt[3]{9}$, $\sqrt[3]{8}$, $\sqrt{5}$, 0, $\sqrt[3]{(42/3)}$ is:

- (a) 0 (b) $4/7$ (c) $3/7$ (d) 1

Q5. CBSE 2026 · 1 mark HCF of two consecutive natural numbers is:

- (a) 2 (b) 1 (c) 0 (d) smaller number

Q6. CBSE 2026 · 1 mark $7 \times 11 \times 13 + 5$ is

- (a) a prime number (b) an odd number
(c) a composite number (d) a multiple of 5

Q7. CBSE 2026 · 1 mark $\sqrt{17} \times \sqrt{11} \times \sqrt{13} + \sqrt{11}$ is

- (a) a prime number (b) multiple of 17
(c) a composite number (d) an odd number

Q8. CBSE 2026 · 1 mark If HCF of 66 and 99 is expressible in the form of $55m - 132$, then the value of m is :

- (a) 4 (b) 2 (c) 1 (d) 3

Q9. CBSE 2026 · 1 mark The product of the H.C.F. and L.C.M. of two numbers 50 and 20 is

- (a) 100 (b) 1000 (c) 50 (d) 20

Q10. CBSE 2026 · 1 mark Assertion (A): H.C.F. ($36m^2$, $18m$) = $18m$, where m is a prime number. Reason (R): H.C.F. of two numbers is always less than or equal to the smaller number.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q11. CBSE 2026 · 1 mark If the HCF of two positive integers a and b is 1, then their LCM is:

- (a) $a + b$ (b) a (c) b (d) ab

Q12. CBSE 2026 · 1 mark The number $3 + \sqrt{2}$ is:

- (a) a rational number (b) an irrational number
(c) an integer (d) a natural number

Q13. CBSE 2026 · 1 mark Assertion (A): For any two natural numbers a and b , the HCF of a and b is a factor of the LCM of a and b . Reason (R): HCF of any two natural numbers divides both the numbers.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q14. CBSE 2026 · 1 mark $\sqrt{2} + \sqrt{3}$ is :

- (a) a rational number (b) an irrational number
(c) an integer (d) a natural number



Q15. CBSE 2026 · 1 mark $\sqrt{2}$ is:

- (a) a rational number (b) an irrational number
(c) an integer (d) a natural number

Q16. CBSE 2026 · 1 mark The number $2n$, where n is a natural number, cannot end with the digit:

- (a) 4 (b) 6 (c) 2 (d) 0

Q17. CBSE 2026 · 1 mark Assertion (A): The prime numbers which divide 36 also divide 6. Reason (R): Any number which divides p^2 also divides p .

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q18. CBSE 2026 · 1 mark The value of $(\text{HCF} \times \text{LCM})$ for the two numbers 3 and 5 is:

- (a) 2 (b) 4 (c) 14 (d) 15

Q19. CBSE 2026 · 1 mark The number 3^n , where n is a natural number cannot end with the digit:

- (a) 1 (b) 3 (c) 5 (d) 7

Q20. CBSE 2026 · 1 mark If the number a^n , where n is a natural number, always ends with digit a , then a is:

- (a) 2 (b) 4 (c) 6 (d) 8

Q21. CBSE 2026 · 1 mark Assertion (A): The prime numbers which divide 36 also divide 6. Reason (R): Any number which divides p^2 also divides p . Select the correct answer from the codes: (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A). (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A). (C) Assertion (A) is true, but Reason (R) is false. (D) Assertion (A) is false, but Reason (R) is true.

- (a) (A) (b) (B) (c) (C) (d) (D)

Q22. CBSE 2026 · 1 mark If $p = 23 \times 32 \times 5$ and $q = 22 \times 33$, then the LCM of p and q is:

- (a) 23×33 (b) 22×32 (c) $22 \times 32 \times 5$ (d) $23 \times 33 \times 5$

Q23. CBSE 2026 · 1 mark $3n$, where n is a natural number, cannot end with the digit:

- (a) 3 (b) 5 (c) 7 (d) 9

Q24. CBSE 2026 · 1 mark A prime number has:

- (a) exactly two prime factors (b) exactly one prime factor
(c) at least one prime factor (d) at least two prime factors

Q25. CBSE 2025 · 1 mark If $\text{HCF}(98, 28) = m$ and $\text{LCM}(98, 28) = n$, then the value of $n - 7m$ is:

- (a) 0 (b) 28 (c) 98 (d) 198

Q26. CBSE 2025 · 1 mark Which of the following is a rational number between 3 and π ?

- (a) 1.4142387954012.... (b) $\sqrt{2}$ (c) π (d) 1.857142

Q27. CBSE 2025 · 1 mark Which of the following is a rational number between $\sqrt{2}$ and $\sqrt{3}$?

- (a) 1.4142387954012.... (b) $\sqrt{2.5}$ (c) $\sqrt{2.8}$ (d) 1.857142

Q28. CBSE 2025 · 1 mark The greatest number which divides 70 and 125, leaving remainders 5 and 8 respectively, is:

- (a) 13 (b) 65 (c) 875 (d) 1750

Q29. CBSE 2025 · 1 mark If $(-1)^n + (-1)^8 = 0$, then n is:

- (a) any positive integer (b) any negative integer
(c) any odd number (d) any even number

Q30. CBSE 2025 · 1 mark The least number which is a perfect square and is divisible by each of 16, 20 and 50, is:

- (a) 1200 (b) 100 (c) 3600 (d) 2400

Q31. CBSE 2025 · 1 mark The sum of the exponents of prime factors in the prime factorisation of 4004 is:

- (a) 5 (b) 4 (c) 3 (d) 2

Q32. CBSE 2025 · 1 mark The HCF of 40, 110 and 360 is:

- (a) 40 (b) 110 (c) 360 (d) 10

Q33. CBSE 2025 · 1 mark If $1080 = 2^p \times 3^q \times 5$, then $(p - q)$ is equal to:

- (a) 6 (b) -1 (c) 1 (d) 0

Q34. CBSE 2025 · 1 mark If $a^b = ab$ is:

- (a) 72 (b) $5\sqrt{10}$ (c) $2\sqrt{10}$ (d) 512

Q35. CBSE 2025 · 1 mark If x is the LCM of 4, 6, 8 and y is the LCM of 3, 5, 7 and p is the LCM of x and y , then which of the following is true?

- (a) $p = 35x$ (b) $p = 4y$ (c) $p = 8x$ (d) $p = 16y$

Q36. CBSE 2024 · 1 mark The LCM of 24, 36 and 60 in terms of their prime factors is:

- (a) $2^2 \times 3 \times 5$ (b) $2^3 \times 3^2$ (c) $2^3 \times 3^2 \times 5$ (d) $2^3 \times 3^3 \times 5$

Q37. CBSE 2024 · 1 mark If the $\text{HCF}(2520, 6600) = 40$ and $\text{LCM}(2520, 6600) = 252 \times k$, then the value of k is

- (a) 1650 (b) 1600 (c) 165 (d) 1625

Q38. CBSE 2024 · 1 mark If $a = 2^2 \times 3^x$, $b = 2^2 \times 3 \times 5$, $c = 2^2 \times 3 \times 7$ and $\text{LCM}(a, b, c) = 3780$, then x is equal to

- (a) 1 (b) 2 (c) 3 (d) 0

Q39. CBSE 2024 · 1 mark Given $\text{HCF}(2520, 6600) = 40$, $\text{LCM}(2520, 6600) = 252 \times k$, then the value of k is:

- (a) 1650 (b) 1600 (c) 165 (d) 1625

Q40. CBSE 2024 · 1 mark A pair of irrational numbers whose product is a rational number is:

- (a) $(\sqrt{16}, \sqrt{4})$ (b) $(\sqrt{5}, \sqrt{2})$ (c) $(\sqrt{3}, \sqrt{27})$ (d) $(\sqrt{36}, \sqrt{2})$

Q41. CBSE 2024 · 1 mark The smallest irrational number by which $\sqrt{20}$ should be multiplied so as to get a rational number, is:

- (a) $\sqrt{20}$ (b) $\sqrt{2}$ (c) $\sqrt{5}$ (d) 5

Q42. CBSE 2024 · 1 mark The HCF of two numbers 65 and 104 is 13. If LCM of 65 and 104 is $40x$, then the value of x is:

- (a) 5 (b) 13 (c) 40 (d) 8



Q43. CBSE 2024 · 1 mark If $3825 = 3^x \times 5^y \times 17^z$, then the value of $x + y - 2z$ is:

- (a) 0 (b) 1 (c) 2 (d) 3

Q44. CBSE 2024 · 1 mark The greatest number which divides 281 and 1249, leaving remainder 5 and 7 respectively, is:

- (a) 23 (b) 276 (c) 138 (d) 69

Q45. CBSE 2024 · 1 mark The LCM of three numbers 28, 44, 132 is:

- (a) 258 (b) 231 (c) 462 (d) 924

Q46. CBSE 2024 · 1 mark If the product of two co-prime numbers is 553, then their HCF is:

- (a) 1 (b) 553 (c) 7 (d) 79

Q47. CBSE 2024 · 1 mark If the prime factorisation of 2520 is $2^3 \times 3^a \times b \times 7$, then the value of $a + 2b$ is:

- (a) 12 (b) 10 (c) 9 (d) 7

Q48. CBSE 2024 · 1 mark The LCM of the smallest prime number and the smallest odd composite number is:

- (a) 10 (b) 6 (c) 9 (d) 18

Q49. CBSE 2024 · 1 mark The HCF of smallest 2-digit number and the smallest composite number is:

- (a) 2 (b) 20 (c) 40 (d) 4

Q50. CBSE 2023 · 1 mark If p and q are natural numbers and p is a multiple of q , then what is the HCF of p and q ?

- (a) pq (b) p (c) q (d) $p + q$

Q51. CBSE 2023 · 1 mark If n is a natural number, then which of the following numbers ends in zero (0) ?

- (a) $(3 - 2)n$ (b) $(2 - 5)n$ (c) $(6 - 2)n$ (d) $(5 - 3)n$

Q52. CBSE 2023 · 1 mark The ratio of HCF to LCM of the least composite number and the least prime number is :

- (a) 1:2 (b) 2:1 (c) 1:1 (d) 1:3

Q53. CBSE 2023 · 1 mark Assertion (A): The number 5^n cannot end with the digit 0, where n is a natural number. Reason (R): Prime factorisation of 5 has only two factors, 1 and 5.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

VERY SHORT ANSWER (21)

Q54. CBSE 2026 · 2 marks Find the H.C.F. and L.C.M. of 1530 and 2040.

Q55. CBSE 2026 · 2 marks If H.C.F. of $135x^2$ and $189x^3$ is 108, then find the value of x .

Q56. CBSE 2026 · 2 marks Find the H.C.F. and L.C.M. of 408 and 312.

Q57. CBSE 2026 · 2 marks Two numbers are in the ratio 3 : 5 and their LCM is 180. Find the HCF of these two numbers.

Q58. CBSE 2026 · 2 marks Find the smallest 5-digit number exactly divisible by 24 and 36.

Q59. CBSE 2026 · 2 marks Prove that $2 - 5\sqrt{3}$ is an irrational number given that $\sqrt{3}$ is irrational.

Q60. CBSE 2025 · 2 marks Find the smallest number which is divisible by both 644 and 462.

Q61. CBSE 2025 · 2 marks (a) Find the smallest number which is divisible by both 644 and 462. OR (b) Two numbers are in the ratio 4 : 5 and their HCF is 11. Find the LCM of these numbers.

Q62. CBSE 2024 · 2 marks Find the smallest number that is divisible by each of 8, 9 and 10.

Q63. CBSE 2024 · 2 marks Can the number $(15)^n$, n being a natural number, end with the digit 0? Give reasons.

Q64. CBSE 2024 · 2 marks Explain why $7 \times 11 \times 13 + 13$ and $7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 + 5$ are composite numbers.

Q65. CBSE 2024 · 2 marks Can the number 8^n , n being a natural number, end with the digit 0? Give reasons.

Q66. CBSE 2024 · 2 marks Three bells toll at intervals of 9, 12 and 15 minutes respectively. If they start tolling together, after what time will they next toll together?

Q67. CBSE 2024 · 2 marks In a school, there are two sections of class X. There are 40 students in the first section and 48 students in the second section. Determine the minimum number of books required for their class library so that they can be distributed equally among students of both sections.

Q68. CBSE 2024 · 2 marks Find the HCF of 84 and 144 by prime factorisation method.

Q69. CBSE 2023 · 2 marks Prove that $2 + \sqrt{3}$ is an irrational number, given that $\sqrt{3}$ is an irrational number.

Q70. CBSE 2023 · 2 marks Prove that $4n$ can never end with digit 0, where n is a natural number.

Q71. CBSE 2023 · 2 marks Prove that $6 - \sqrt{7}$ is irrational number, given that $\sqrt{7}$ is an irrational number.

Q72. CBSE 2023 · 2 marks Two numbers are in the ratio 2 : 3 and their LCM is 180. What is the HCF of these numbers ?

Q73. CBSE 2023 · 2 marks Using prime factorisation, find HCF and LCM of 96 and 120.

Q74. CBSE 2023 · 2 marks Find the greatest 3-digit number which is divisible by 18, 24 and 36.

SHORT ANSWER (15)

Q75. CBSE 2026 · 3 marks Prove that $2 + 3\sqrt{5/7}$ is an irrational number, given that $\sqrt{5}$ is an irrational number.

Q76. CBSE 2026 · 3 marks The dimensions of a window are 156 cm $\times$ 216 cm. Arjun wants to put grill on the window creating complete squares of maximum size. Determine the side length of the square and hence find the number of squares formed.

Q77. CBSE 2026 · 3 marks (a) Prove that $\sqrt{5}$ is an irrational number. OR (b) Find the LCM of 36 and 54.

Q78. CBSE 2026 · 3 marks Find which among the following numbers a , b and c is/are composite numbers. $a = 7 \times 11 \times 13 + 13$, $b = 6 \times 5 \times 4 + 4$, $c = 7 \times 13 + 6$



Q79. CBSE 2025 · 3 marks Three sets of Physics, Chemistry and Mathematics books have to be stacked in such a way that all the books are stored subject-wise and the height of each stack is the same. The number of Physics books is 144, the number of Chemistry books is 180 and the number of Mathematics books is 192. Assuming that the books are of same thickness, determine the number of stacks of Physics, Chemistry and Mathematics books.

Q80. CBSE 2025 · 3 marks Prove that $\sqrt{7}$ is an irrational number.

Q81. CBSE 2025 · 3 marks Prove that $\sqrt{2}$ is an irrational number.

Q82. CBSE 2025 · 3 marks Prove that $\sqrt{3} - \sqrt{2}$ is an irrational number given that $\sqrt{6}$ is an irrational number.

Q83. CBSE 2025 · 3 marks Prove that $\sqrt{3}$ is an irrational number given that $\sqrt{2}$ is an irrational number.

Q84. CBSE 2024 · 3 marks Prove that $2 - 3\sqrt{5}$ is an irrational number, given that $\sqrt{3}$ is an irrational number.

Q85. CBSE 2024 · 3 marks Prove that $5\sqrt{3} - 2$ is an irrational number, given that $\sqrt{3}$ is an irrational number.

Q86. CBSE 2023 · 3 marks Find by prime factorisation the LCM of the numbers 18180 and 7575. Also, find the HCF of the two numbers.

Q87. CBSE 2023 · 3 marks Prove that $\sqrt{5}$ is an irrational number.

Q88. CBSE 2023 · 3 marks Prove that $\sqrt{3}$ is an irrational number.

Q89. CBSE 2023 · 3 marks (a) Prove that $\sqrt{3}$ is an irrational number. OR (b) The traffic lights at three different road crossings change after every 48 seconds, 72 seconds and 108 seconds respectively. If they change simultaneously at 7 a.m., at what time will they change together next?

CASE-BASED (1)

CASE STUDY · CBSE 2024

Teaching Mathematics through activities is a powerful approach that enhances students' understanding and engagement. Keeping this in mind, Ms. Mukta planned a prime number game for class 5 students. She announces the number 2 in her class and asked the first student to multiply it by a prime number and then pass it to second student. Second student also multiplied it by a prime number and passed it to third student. In this way by multiplying to a prime number, the last student got 173250.

Q90. CBSE 2024 · 1 mark What is the least prime number used by students?

2 Polynomials

Notes & MCQs →

MULTIPLE CHOICE AND ASSERTION-REASON (32)

Q1. CBSE 2026 · 1 mark The value of k for which sum of the zeroes of the polynomial $p(x) = 3x^2 - kx + 6$ is 2, is

- (a) 2 (b) -6 (c) -2 (d) 6

Q2. CBSE 2026 · 1 mark If the zeroes of the polynomial $p(x) = 2x^2 - 7x + 6$ are α and β , then the value of $1/\alpha + 1/\beta$ is

- (a) $7/2$ (b) $6/7$ (c) $-7/6$ (d) $7/6$

Q3. CBSE 2026 · 1 mark The graph of a quadratic polynomial $f(x)$ passes through (5,0), (0, -1) and (-2, 0). The two factors of the polynomial are

- (a) $(x + 2), (x - 5)$ (b) $(x + 5), (x - 2)$ (c) $(x + 1), (x - 5)$
(d) $(x - 1), (x + 2)$

Q4. CBSE 2026 · 1 mark If α and β are two zeroes of the quadratic polynomial $p(x) = x^2 - 11x + 30$, then $1/\alpha + 1/\beta$ is equal to:

- (a) $30/11$ (b) $11/30$ (c) $-11/30$ (d) $-30/11$

Q5. CBSE 2026 · 1 mark If the zeroes of a polynomial $p(x)$ are -3 and 8, then $p(x)$ equals

- (a) $x^2 + 5x - 4$ (b) $(x + 3)(-x + 8)$ (c) $a(x^2 + 5x - 24)$
(d) $x^2 - 24$

Q6. CBSE 2025 · 1 mark If $(-1)^n + (-1)^8 = 0$, then n is:

- (a) any positive integer (b) any negative integer
(c) any odd number (d) any even number

Q7. CBSE 2025 · 1 mark If α and β are the zeroes of polynomial $3x^2 + 6x + k$ such that $\alpha + \beta + \alpha\beta = -4/3$, then the value of k is:

- (a) -8 (b) 8 (c) -4 (d) 4

Q8. CBSE 2025 · 1 mark The sum of the zeroes of the polynomial $p(x) = 5x^3 - 7x^2 + 3$ is:

- (a) $7/5$ (b) $-7/5$ (c) 3 (d) -3

Q9. CBSE 2025 · 1 mark If 4 is a zero of the polynomial $p(x) = x^2 - x - (2 + 2k)$, then the value of k is:

- (a) 3 (b) 9 (c) 6 (d) -9

Q10. CBSE 2025 · 1 mark If one zero of the polynomial $q(x) = (p^2 + 4)x^2 + 65x + 4p$ is reciprocal of the other, then the value of p is:

- (a) -1 (b) 1 (c) -2 (d) 2

Q11. CBSE 2025 · 1 mark If α and β are the zeroes of the polynomial $p(x) = x^2 - ax - b$, then the value of $(\alpha + \beta + \alpha\beta)$ is equal to:

- (a) $a + b$ (b) $-a - b$ (c) $a - b$ (d) $-a + b$

Q12. CBSE 2025 · 1 mark Zeroes of the polynomial $p(x) = x^2 - 3x + 4$ are:

- (a) 2, -2 (b) 2, $1/2$ (c) 4, $1/4$ (d) $1/2$, 2

Q13. CBSE 2024 · 1 mark The graph of a polynomial intersects the y -axis at one point and the x -axis at two points. The number of zeroes of this polynomial are:

- (a) 1 (b) 2 (c) 3 (d) 0

Q14. CBSE 2024 · 1 mark If a and b are zeroes of the polynomial $5x^2 + 3x - 7$, the value of $1/a + 1/b$ is

- (a) $-3/7$ (b) $3/5$ (c) $3/7$ (d) $-5/7$

Q15. CBSE 2024 · 1 mark If a and b are zeroes of the polynomial $2x^2 - 9x + 5$, then value of $a^2 + b^2$ is

- (a) $1/4$ (b) $61/4$ (c) 1 (d) $71/4$



Q16. CBSE 2024 · 1 mark If a and b ($a > b$) are the zeroes of the polynomial $-x^2 + 8x + 9$, then $(a - b)$ is equal to

- (a) -10 (b) 10 (c) ± 10 (d) 8

Q17. CBSE 2024 · 1 mark The zeroes of the quadratic polynomial $2x^2 - 3x - 9$ are:

- (a) $3, -3/2$ (b) $-3, -3/2$ (c) $-3, 3/2$ (d) $3, 3/2$

Q18. CBSE 2024 · 1 mark What should be subtracted from the polynomial $x^2 - 16x + 30$, so that 15 is the zero of the resulting polynomial?

- (a) 30 (b) 14 (c) 15 (d) 16

Q19. CBSE 2024 · 1 mark What should be added from the polynomial $x^2 - 5x + 4$, so that 3 is the zero of the resulting polynomial?

- (a) 1 (b) 2 (c) 4 (d) 5

Q20. CBSE 2024 · 1 mark If a polynomial $p(x)$ is given by $p(x) = x^2 - 5x + 6$, then the value of $p(1) + p(4)$ is:

- (a) 0 (b) 4 (c) 2 (d) -4

Q21. CBSE 2024 · 1 mark A quadratic polynomial, one of whose zeroes is $2 + \sqrt{5}$ and the sum of whose zeroes is 4 , is:

- (a) $x^2 + 4x - 1$ (b) $x^2 - 4x - 1$ (c) $x^2 - 4x + 1$
(d) $x^2 + 4x + 1$

Q22. CBSE 2024 · 1 mark If a and b are the zeroes of the polynomial $p(x) = kx^2 - 30x + 45k$ and $a + b = ab$, then the value of k is:

- (a) $-3/2$ (b) $-2/3$ (c) $2/3$ (d) $3/2$

Q23. CBSE 2024 · 1 mark A quadratic polynomial, the sum of whose zeroes is -5 and their product is 6 , is

- (a) $x^2 + 5x + 6$ (b) $x^2 - 5x + 6$ (c) $x^2 - 5x - 6$
(d) $-x^2 + 5x + 6$

Q24. CBSE 2023 · 1 mark If one zero of the polynomial $6x^2 + 37x - (k - 2)$ is reciprocal of the other, then what is the value of k ?

- (a) -4 (b) -6 (c) 6 (d) 4

Q25. CBSE 2023 · 1 mark The zeroes of the polynomial $p(x) = x^2 + 4x + 3$ are given by:

- (a) $-1, -3$ (b) $1, 3$ (c) $-1, 3$ (d) $1, -3$

Q26. CBSE 2023 · 1 mark If α and β are the zeroes of the quadratic polynomial $p(x) = x^2 - ax - b$, then the value of $\alpha^2 + \beta^2$ is:

- (a) $a^2 - 2b$ (b) $a^2 + 2b$ (c) $b^2 - 2a$ (d) $b^2 + 2a$

Q27. CBSE 2023 · 1 mark Assertion (A): The polynomial $p(x) = x^2 + 3x + 3$ has two real zeroes. Reason (R): A quadratic polynomial can have at most two real zeroes.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q28. CBSE 2023 · 1 mark The sum of zeroes of the polynomial $2x^2 - 17$ are given as :

- (a) $22/17$ (b) $-22/17$ (c) 0 (d) 1

Q29. CBSE 2023 · 1 mark If α, β are zeroes of the polynomial $x^2 - 1$, then value of $(\alpha + \beta)$ is :

- (a) 2 (b) 1 (c) -1 (d) 0

Q30. CBSE 2023 · 1 mark If α, β are the zeroes of the polynomial $p(x) = 4x^2 - 3x - 7$, then $1/\alpha + 1/\beta$ is equal to :

- (a) $7/3$ (b) $-7/3$ (c) $3/7$ (d) $-3/7$

Q31. CBSE 2023 · 1 mark The number of polynomials having zeroes 3 and 5 is :

- (a) only one (b) infinite (c) exactly two (d) at most two

Q32. CBSE 2023 · 1 mark The number of polynomials having zeroes 1 and 2 is:

- (a) exactly 2 (b) only 1 (c) at most 2 (d) infinite

VERY SHORT ANSWER (14)

Q33. CBSE 2026 · 2 marks If α, β are the zeroes of polynomial $p(x) = 6x^2 - 5x - 3$, then find the value of $1/\alpha + 1/\beta$.

Q34. CBSE 2026 · 2 marks If α and β are the zeroes of polynomial $p(x) = -9x^2 - 6x + 1$. Find the value of $\alpha^2 + \beta^2$.

Q35. CBSE 2026 · 2 marks Form a quadratic polynomial whose sum and product of the zeroes are $1/2$ and $-1/9$ respectively. Hence, find the zeroes of the polynomial.

Q36. CBSE 2026 · 2 marks Find the quadratic polynomial the sum of whose zeroes is 1 and their product is -12 . Hence find the zeroes of the polynomial.

Q37. CBSE 2026 · 2 marks Find the zeroes of the polynomial $p(x) = 15x^2 - 19x + 6$.

Q38. CBSE 2025 · 2 marks Find the zeroes of the polynomial $p(x) = x^2 + \sqrt{2}x - \sqrt{6}$.

Q39. CBSE 2025 · 2 marks If the zeroes of the polynomial $x^2 + ax + b$ are in the ratio $3 : 4$, then prove that $12a^2 = 49b$.

Q40. CBSE 2025 · 2 marks Find the zeroes of the polynomial $p(x) = x^2 + (7/6)x - 5$.

Q41. CBSE 2025 · 2 marks If p and q are zeroes of the polynomial $p(y) = 21y^2 - y - 2$, then find the value of $(1 - p)(1 - q)$.

Q42. CBSE 2025 · 2 marks Find a quadratic polynomial whose zeroes are 2 and $1/2$.

Q43. CBSE 2025 · 2 marks If the sum of the zeroes of the polynomial $p(x) = (p + 1)x^2 + (2p + 3)x + (3p + 4)$ is -1 , then find the value of p .

Q44. CBSE 2024 · 2 marks If a, b are zeroes of the polynomial $p(x) = 5x^2 - 6x + 1$, then find the value of $a + b + ab$.

Q45. CBSE 2024 · 2 marks If a and b are zeroes of the quadratic polynomial $p(x) = x^2 - 5x + 4$, then find the value of $1/a + 1/b - 2ab$.

Q46. CBSE 2023 · 2 marks If one zero of the polynomial $p(x) = 6x^2 + 37x - (k - 2)$ is reciprocal of the other, then find the value of k .

SHORT ANSWER (17)

Q47. CBSE 2026 · 3 marks If α and β are zeroes of the polynomial $p(x) = 5x^2 - 7x - 3$, then form a quadratic polynomial whose zeroes are α^2 and β^2 .



Q48. CBSE 2026 · 3 marks (a) Find the zeroes of the polynomial $p(x) = 4x^2 - 8x + 3$ and verify the relationship between its zeroes and co-efficients. OR (b) Form a polynomial whose zeroes are 2α and 2β , where α and β are zeroes of the polynomial $p(x) = x^2 - 3\sqrt{2}x + 4$.

Q49. CBSE 2026 · 3 marks If α, β are zeroes of the polynomial $p(x) = 5x^2 - 7x - 3$, then form a quadratic polynomial whose zeroes are $\alpha/2$ and $\beta/2$.

Q50. CBSE 2026 · 3 marks Find a quadratic polynomial whose sum and product of zeroes are 0 and -9, respectively. Also, find the zeroes of the polynomial so obtained.

Q51. CBSE 2026 · 3 marks Find a quadratic polynomial, sum and product of whose zeroes are 5 and -6, respectively. Also, find the zeroes of the polynomial so obtained.

Q52. CBSE 2026 · 3 marks Determine a quadratic polynomial, sum and product of whose zeroes are -10 and 24, respectively. Also, determine the zeroes of the polynomial so obtained.

Q53. CBSE 2026 · 3 marks Find the zeroes of the polynomial $p(x) = 3x^2 - 2x - 1$ and verify the relationship between the zeroes of $p(x)$ and the coefficients of $p(x)$.

Q54. CBSE 2026 · 3 marks Find the zeroes of the polynomial $p(x) = 2x^2 + 5x + 2$ and verify the relationship between zeroes of $p(x)$ and its coefficients.

Q55. CBSE 2026 · 3 marks Find the zeroes of the polynomial $q(x) = 6x^2 - 5x - 1$ and verify the relationship between the zeroes of $q(x)$ and its coefficients.

Q56. CBSE 2026 · 3 marks Find the zeroes of the polynomial $9s^2 - 6s + 1$ and verify the relationship between the zeroes and the coefficients of the given polynomial.

Q57. CBSE 2026 · 3 marks Find the zeroes of the polynomial $4x^2 + 4x + 1$ and verify the relationship between the zeroes and the coefficients of the given polynomial.

Q58. CBSE 2026 · 3 marks Find the zeroes of the polynomial $25a^2 - 10a + 1$ and verify the relationship between the zeroes and coefficients of the given polynomial.

Q59. CBSE 2024 · 3 marks If a and b are the zeroes of the quadratic polynomial $f(x) = 6x^2 + 11x - 10$, find the value of $a/b + b/a$.

Q60. CBSE 2024 · 3 marks Find the zeroes of the quadratic polynomial $x^2 - 15$ and verify the relationship between the zeroes and the coefficients of the polynomial.

Q61. CBSE 2024 · 3 marks (a) Find the zeroes of the polynomial $4x^2 + 4x - 3$ and verify the relationship between zeroes and coefficients of the polynomial. OR (b) If a and b are the zeroes of the polynomial $x^2 + x - 2$, then find the value of $a/b + b/a$.

Q62. CBSE 2024 · 3 marks (a) Find the zeroes of the polynomial $4x^2 + 4x - 3$ and verify the relationship between zeroes and coefficients of the polynomial.

Q63. CBSE 2024 · 3 marks (a) Zeroes of the quadratic polynomial $x^2 + x - 6$ are 'a' and 'b'. Construct a quadratic polynomial whose zeroes are $1/a$ and $1/b$.

CASE-BASED (5)

CASE STUDY · CBSE 2026

While playing badminton Ravi has set the barrier chain hung between two posts at the edge of the walkway of a street. It is hung in the shape of a parabola.

Q64. CBSE 2026 · 4 marks Which type of the polynomial (linear, quadratic, cubic etc.) is graphically represented by a parabola?

CASE STUDY · CBSE 2024

A ball is thrown in the air so that t seconds after it is thrown, its height h metre above its starting point is given by the polynomial $h = 25t - 5t^2$.

Q65. CBSE 2024 · 1 mark Write zeroes of the given polynomial.

Q66. CBSE 2024 · 1 mark Assertion (A): Degree of a zero polynomial is not defined. Reason (R): Degree of a non-zero constant polynomial is 0.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
- (b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
- (c) Assertion (A) is true, but Reason (R) is false.
- (d) Assertion (A) is false, but Reason (R) is true.

Q67. CBSE 2024 · 1 mark Assertion (A): Degree of a zero polynomial is not defined. Reason (R): Degree of a non-zero constant polynomial is 0. Select the correct answer from the codes given: (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A). (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A). (C) Assertion (A) is true, but Reason (R) is false. (D) Assertion (A) is false, but Reason (R) is true.

- (a) (A) (b) (B) (c) (C) (d) (D)

CASE STUDY · CBSE 2023

In a pool at an aquarium, a dolphin jumps out of the water travelling at 20 cm per second. Its height above water level after t seconds is given by $h = 20t - 16t^2$.

Q68. CBSE 2023 · 1 mark Find zeroes of polynomial $p(t) = 20t - 16t^2$.

3 Pair of Linear Equations in Two Variables

Notes & MCQs →



MULTIPLE CHOICE AND ASSERTION-REASON (32)

Q1. CBSE 2026 · 1 mark If pair of linear equations given by $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ has infinitely many solutions, then which of the following is definitely true?

- (a) $a_1/a_2 = c_1/c_2$ (b) $a_1a_2 \neq b_1b_2$ (c) $a_1/b_1 = a_2/b_2$
(d) $a_1b_2 = a_2b_1$

Q2. CBSE 2026 · 1 mark The value of k for which the pair of linear equations $kx - 3y = 5$, $4x - 6y = 10$ has infinitely many solutions, is:

- (a) 4 (b) 3 (c) 2 (d) 1

Q3. CBSE 2026 · 1 mark Assertion (A): The system of linear equations $3x - 5y + 7 = 0$ and $-6x + 10y + 14 = 0$ is inconsistent. Reason (R): When two linear equations don't have unique solution, they always represent parallel lines.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q4. CBSE 2026 · 1 mark Assertion (A): The value of p for which the system of equations $4x + py + 8 = 0$ and $2x + 2y + 2 = 0$ is consistent is 4. Reason (R): The system of equations $a_1x + b_1y = c_1$ and $a_2x + b_2y = c_2$ is consistent with infinitely many solutions, if $a_1/a_2 = b_1/b_2 = c_1/c_2$.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q5. CBSE 2026 · 1 mark If $(0, 0)$ is the solution of the equation $x + y = c - 1$, then the value of c is:

- (a) 0 (b) 1 (c) -1 (d) any real number

Q6. CBSE 2026 · 1 mark The number of solutions of the system of equations $x = 3$, $y = 1$ is:

- (a) 0 (b) 1 (c) 2 (d) Infinite

Q7. CBSE 2026 · 1 mark The number of solutions of the system of equations $x = a$, $x = b$ ($a \neq b$) is:

- (a) 0 (b) 1 (c) 2 (d) Infinite

Q8. CBSE 2026 · 1 mark For what value(s) of k does the system of equations $kx + 2y = 3$ and $2x + y = 5$ have a unique solution?

- (a) $k = a$ real number (b) $k \neq 8$ (c) $k \neq 4$ (d) $k = 4$

Q9. CBSE 2026 · 1 mark For what value(s) of k , is the system of equations $kx + 2y = 3$ and $2x + y = 5$ inconsistent?

- (a) $k =$ Any real number (b) $k \neq 2$ (c) $k \neq 4$ (d) $k = 4$

Q10. CBSE 2026 · 1 mark The system of linear equations given by $x = a$ and $y = b$ is:

- (a) Consistent with a unique solution.
(b) Consistent with infinitely many solutions.
(c) Consistent with two solutions. (d) Inconsistent.

Q11. CBSE 2025 · 1 mark If $x = 1$ and $y = 2$ is a solution of the pair of linear equations $2x - 3y + a = 0$ and $2x + 3y - b = 0$, then:

- (a) $a = 2b$ (b) $2a = b$ (c) $a + 2b = 0$ (d) $2a + b = 0$

Q12. CBSE 2025 · 1 mark Assertion (A): The pair of linear equations $px + 3y + 59 = 0$ and $2x + 6y + 118 = 0$ will have infinitely many solutions if $p = 1$. Reason (R): If the pair of linear equations $px + 3y + 19 = 0$ and $2x + 6y + 157 = 0$ has a unique solution, then $p \neq 1$.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q13. CBSE 2025 · 1 mark The value of k for which the system $6x + y = 3k$ and $36x + 6y = 3$ have infinitely many solutions is:

- (a) 6 (b) $1/2$ (c) $3/2$ (d) $1/6$

Q14. CBSE 2025 · 1 mark A system of two linear equations in two variables is inconsistent, if the lines in the graph are:

- (a) coincident (b) parallel (c) intersecting at one point
(d) intersecting at right angles

Q15. CBSE 2024 · 1 mark The solution of the pair of linear equations $2x/3 - y/2 = -16$ and $x/2 + 2y/3 = 3$ is:

- (a) $x = 2$, $y = -3$ (b) $x = -2$, $y = 3$ (c) $x = 2$, $y = 3$
(d) $x = -2$, $y = -3$

Q16. CBSE 2024 · 1 mark The value of k for which the system of equations $3x - y + 8 = 0$ and $6x - ky + 16 = 0$ has infinitely many solutions, is

- (a) -2 (b) 2 (c) $1/2$ (d) $-1/2$

Q17. CBSE 2024 · 1 mark The pair of linear equations $x + 2y + 5 = 0$ and $-3x = 6y - 1$ has

- (a) unique solution (b) exactly two solutions
(c) infinitely many solutions (d) no solution

Q18. CBSE 2024 · 1 mark If a pair of linear equations in two variables is consistent, then the lines represented by the two equations are:

- (a) always intersecting (b) parallel (c) always coincident
(d) intersecting or coincident

Q19. CBSE 2024 · 1 mark If $ax + by = a^2 - b^2$ and $bx + ay = 0$, then the value of $x + y$ is:

- (a) $a^2 - b^2$ (b) $a + b$ (c) $a - b$ (d) $a^2 + b^2$

Q20. CBSE 2024 · 1 mark Two lines are given to be parallel. The equation of one of these lines is $5x - 3y = 2$. The equation of the second line can be:

- (a) $-15x - 9y = 5$ (b) $15x + 9y = 5$ (c) $9x - 15y = 6$
(d) $-15x + 9y = 5$

Q21. CBSE 2024 · 1 mark The pair of linear equations $y = 0$ and $y = -7$ have

- (a) exactly one solution (b) two solutions
(c) infinitely many solutions (d) no solution



Q22. CBSE 2024 · 1 mark Which out of the following type of straight lines will be represented by the system of equations $3x + 4y = 5$ and $6x + 8y = 7$?

- (a) Parallel (b) Intersecting (c) Coincident
(d) Perpendicular to each other

Q23. CBSE 2024 · 1 mark The graph of a pair of linear equations $a_1x + b_1y = c_1$ and $a_2x + b_2y = c_2$ in two variables x and y represents parallel lines, if

- (a) $a_1/a_2 \neq b_1/b_2$ (b) $a_1/a_2 = b_1/b_2 = c_1/c_2$
(c) $a_1/a_2 = b_1/b_2 \neq c_1/c_2$ (d) $a_1/a_2 \neq b_1/b_2 = c_1/c_2$

Q24. CBSE 2024 · 1 mark The value of 'k' for which the pair of linear equations $x + y - 4 = 0$ and $2x + ky - 8 = 0$ has infinitely many solutions, is

- (a) $k \neq 2$ (b) $k \neq -2$ (c) $k = 2$ (d) $k = -2$

Q25. CBSE 2023 · 1 mark If the pair of equations $3x - y + 8 = 0$ and $6x - ry + 16 = 0$ represent coincident lines, then the value of r is:

- (a) 2 (b) -2 (c) $1/2$ (d) $-1/2$

Q26. CBSE 2023 · 1 mark The pair of equations $x = a$ and $y = b$ graphically represents lines which are:

- (a) parallel (b) intersecting at (b, a) (c) coincident
(d) intersecting at (a, b)

Q27. CBSE 2023 · 1 mark If the pair of equations $3x - y + 8 = 0$ and $6x - ry + 16 = 0$ represent parallel lines, then the value of r is:

- (a) -2 (b) 2 (c) $-2/1$ (d) $2/1$

Q28. CBSE 2023 · 1 mark If $2x + 3y = 15$ and $3x + 2y = 25$, then the value of $x - y$ is:

- (a) -10 (b) 8 (c) 10 (d) -8

Q29. CBSE 2023 · 1 mark If the pair of equations $3x - y + 8 = 0$ and $6x - ry + 16 = 0$ represent coincident lines, then r equals:

- (a) $1/2$ (b) $-1/2$ (c) 2 (d) -2

Q30. CBSE 2023 · 1 mark The pair of linear equations $2x = 5y + 6$ and $15y = 6x - 18$ represents two lines which are:

- (a) intersecting (b) parallel (c) coincident
(d) either intersecting or parallel

Q31. CBSE 2023 · 1 mark The pair of equations $ax + 2y = 9$ and $3x + by = 18$ represent parallel lines, where a, b are integers, if:

- (a) $a = b$ (b) $3a = 2b$ (c) $2a = 3b$ (d) $ab = 6$

Q32. CBSE 2023 · 1 mark The solution of the pair of equations $x + y = a + b$ and $ax - by = a^2 - b^2$ is:

- (a) $x = b, y = a$ (b) $x = -a, y = b$ (c) $x = a, y = b$
(d) $x = a, y = -b$

VERY SHORT ANSWER (12)

Q33. CBSE 2026 · 2 marks Solve the following system of equations for x and y : $1/x + 1/y = 1$ and $x - y = 3$

Q34. CBSE 2026 · 2 marks Solve for x and y : $0.1x + 0.3y = 1$ and $0.2x - 0.1y = -0.1$

Q35. CBSE 2026 · 2 marks Solve for x and y : $3x + 5y = 8$; $5x - 3y = 2$

Q36. CBSE 2026 · 2 marks (a) Find the value of c for which the following pair of linear equations has infinitely many solutions: $cx + 3y = c - 3$ and $12x + cy = c$

Q37. CBSE 2026 · 2 marks (a) Find the value of c for which the following pair of linear equations has infinitely many solutions: $cx + 3y = c - 3$, $12x + cy = c$

Q38. CBSE 2026 · 2 marks (a) Find the value of c for which the following pair of linear equations has infinitely many solutions: $cx + 3y = c - 3$ and $12x + cy = c$. OR (b) Solve for x and y : $3x + 2y = 65$ and $2x + 3y = 60$

Q39. CBSE 2026 · 2 marks Solve the following system of equations graphically: $2x - 3y = -6$ and $x = 3$

Q40. CBSE 2026 · 2 marks Solve the following system of equations graphically: $x + 2y = 10$ and $y = 3$

Q41. CBSE 2026 · 2 marks Solve the following system of linear equations graphically: $x + y = 5$ and $x - y = 3$

Q42. CBSE 2024 · 2 marks If $2x + y = 13$ and $4x - y = 17$, find the value of $(x - y)$.

Q43. CBSE 2024 · 2 marks (a) The sum of two natural numbers is 70 and their difference is 10. Find the natural numbers.

Q44. CBSE 2022 · 2 marks Rohan's age 5 years ago and his age 7 years from now, when multiplied together, is one more than twice his present age. Find his present age.

SHORT ANSWER (20)

Q45. CBSE 2026 · 3 marks Solve the following pair of linear equations: $31x + 43y - 117 = 0$; $43x + 31y = 105$

Q46. CBSE 2026 · 3 marks Solve the system of linear equations: $x = 4$ and $3x - 2y = 6$ graphically.

Q47. CBSE 2026 · 3 marks (a) Solve the following system of equations graphically: $x + 3y = 6$; $2x - 3y = 12$ OR (b) x and y are complementary angles such that $x : y = 1 : 2$. Express the given information as a system of linear equations in two variables and hence solve it.

Q48. CBSE 2026 · 3 marks Solve the following system of equations graphically: $x + 3y = 6$; $2x - 3y = 12$

Q49. CBSE 2026 · 3 marks (a) Solve graphically the following pair of linear equations: $2x - y = 2$ and $4x - y = 4$. Also, write the coordinates of the points where the lines represented by these equations cut the y -axis.

Q50. CBSE 2026 · 3 marks (a) Solve graphically the following pair of linear equations: $2x - y = 2$ and $4x - y = 4$. Also, write the coordinates of the points where the lines represented by these equations cut the y -axis. OR (b) An academy offering cricket coaching bought 10 bats and 5 balls for ₹32,500. Later, the academy bought 2 bats and 8 balls for ₹10,000. If there is no change in the cost of the bat and of the ball, find the cost of 1 bat and 1 ball.

Q51. CBSE 2026 · 3 marks A fraction becomes $1/3$, when 1 is subtracted from the numerator and it becomes $1/4$, when 8 is added to its denominator. Find the fraction.



Q52. CBSE 2026 · 3 marks Find the value of k for which the following pair of linear equations will have infinitely many solutions: $kx + 3y - (k - 3) = 0$ and $12x + ky - k = 0$. Hence, find any two solutions of the given pair of equations.

Q53. CBSE 2024 · 3 marks The monthly incomes of A and B are in the ratio 8 : 7 and their expenditures are in the ratio 19 : 16. If each saves ₹2500 per month, find the monthly income of each.

Q54. CBSE 2024 · 3 marks In a 2-digit number, the digit at the unit's place is 5 less than the digit at the ten's place. The product of the digits is 36. Find the number.

Q55. CBSE 2024 · 3 marks A dealer sells an article for ₹75 and gains as much percent as the cost price of the article. Find the cost price of the article.

Q56. CBSE 2024 · 3 marks Solve the following system of linear equations graphically: $x - y + 1 = 0$ and $x + y = 5$

Q57. CBSE 2024 · 3 marks Rehana went to a bank to withdraw ₹2,000. She asked the cashier to give her ₹50 and ₹100 notes only. Rehana got 25 notes in all. Find how many notes of ₹50 and ₹100 did she receive.

Q58. CBSE 2024 · 3 marks A part of monthly hostel charges is fixed and the remaining depends on the number of days one has taken food in the mess. When a student A takes food for 20 days, she has to pay ₹1,500 as hostel charges while another student B, who takes food for 26 days, pays ₹1,800. Find the fixed charges and the cost of food.

Q59. CBSE 2023 · 3 marks If the system of linear equations $2x + 3y = 7$ and $2ax + (a + b)y = 28$ has infinitely many solutions, then find the values of a and b .

Q60. CBSE 2023 · 3 marks If $217x + 131y = 913$ and $131x + 217y = 827$, then solve the equations for the values of x and y .

Q61. CBSE 2023 · 3 marks Two people are 16 km apart on a straight road. They start walking at the same time. If they walk towards each other with different speeds, they will meet in 2 hours. Had they walked in the same direction with same speeds as before, they would have met in 8 hours. Find their walking speeds.

Q62. CBSE 2023 · 3 marks A 2-digit number is seven times the sum of its digits. The number formed by reversing the digits is 18 less than the given number. Find the given number.

Q63. CBSE 2023 · 3 marks A fraction becomes $\frac{3}{1}$ when 1 is subtracted from the numerator. It becomes $\frac{4}{1}$ when 8 is added to the denominator. Find the fraction.

Q64. CBSE 2022 · 2 marks Rohan's age 5 years ago and his age 7 years from now, if multiplied together, is one more than twice his present age. Find his present age.

LONG ANSWER (9)

Q65. CBSE 2026 · 5 marks The difference between two numbers is 12. The greater number is 6 less than twice the smaller one. (i) Representing the above situation, frame two linear equations in two variables. (ii) Show that the equations have unique solution. (iii) Solve the equations and hence find the numbers.

Q66. CBSE 2026 · 5 marks Venkat can row a boat in still water at the speed of 12 km/h. He ferries tourists 15 km upstream and 18 km downstream in 3 hours. Find the speed of the stream.

Q67. CBSE 2025 · 5 marks Vijay invested certain amounts of money in two schemes A and B, which offer interest at the rate of 8% per annum and 9% per annum, respectively. He received ₹1,860 as the total annual interest. However, had he interchanged the amounts of investments in the two schemes, he would have received ₹20 more as annual interest. How much money did he invest in each scheme?

Q68. CBSE 2025 · 5 marks A bag contains some red and blue balls. Ten percent of the red balls, when added to twenty percent of the blue balls, give a total of 24. If three times the number of red balls exceeds the number of blue balls by 20, find the number of red and blue balls.

Q69. CBSE 2025 · 5 marks A man lent a part of his money at 10% p.a. and the rest at 15% p.a. His income at the end of the year is ₹1,900. If he had interchanged the rate of interest on the two sums, he would have earned ₹200 more. Find the amount lent in both cases.

Q70. CBSE 2025 · 5 marks The students of a class are made to stand equally in rows. If 3 students are extra in each row, there would be 1 row less. If 3 students are less in a row, there would be 2 more rows. Find the number of students in the class.

Q71. CBSE 2024 · 5 marks Using graphical method, solve the following system of equations: $3x + y + 4 = 0$ and $3x - y + 2 = 0$

Q72. CBSE 2024 · 5 marks If the length of a rectangle is reduced by 5 cm and its breadth is increased by 2 cm, then the area of the rectangle is reduced by 80 cm^2 . However, if we increase the length by 10 cm and decrease the breadth by 5 cm, its area is increased by 50 cm^2 . Find the length and breadth of the rectangle.

Q73. CBSE 2024 · 5 marks Using graphical method, solve the following system of equations: $3x - 2y = 10$ and $5x + 3y = 4$

CASE-BASED (6)

CASE STUDY · CBSE 2026

Seema daily goes to a park to exercise on machines available there. When Seema spent 15 minutes on exercise bicycle and 30 minutes on double cross walker, she received a message of burning 435 calories on her fitness watch. When she spent 30 minutes on exercise bicycle and 40 minutes on double cross walker, she received a message of burning 690 calories.

Q74. CBSE 2026 · 1 mark Represent the above situation in terms of a pair of linear equations in two variables.

CASE STUDY · CBSE 2025

A school is organizing a grand cultural event to show the talent of its students. To accommodate the guests, the school plans to rent chairs and tables from a local supplier. It finds that rent for each chair is ₹50 and for each table is ₹200. The school spends ₹30,000 for renting the chairs and tables. Also, the total number of items (chairs and tables) rented are 300.



Q75. CBSE 2025 · 1 mark Write down the pair of linear equations representing the given information.

CASE STUDY · CBSE 2024

Essel World is one of India's largest amusement parks that offers a diverse range of thrilling rides, water attractions and entertainment options for visitors of all ages. The park is known for its iconic "Water Kingdom" section, making it a popular destination for family outings and fun-filled adventure. The ticket charges for the park are ₹150 per child and ₹250 per adult. On a day, the cashier of the park found that 300 tickets were sold and an amount of ₹55,000 was collected.

Q76. CBSE 2024 · 1 mark If the number of children visited be x and the number of adults visited be y , then write the given situation algebraically.

Q77. CBSE 2024 · 4 marks (i) If the number of children visited be x and the number of adults visited be y , then write the given situation algebraically. (ii) (a) How many children visited the amusement park that day? OR (b) How many adults visited the amusement park that day? (iii) How much amount will be collected if 250 children and 100 adults visit the amusement park?

CASE STUDY · CBSE 2023

Two schools 'P' and 'Q' decided to award prizes to their students for two games of Hockey ₹ x per student and Cricket ₹ y per student. School 'P' decided to award a total of ₹9,500 for the two games to 5 and 4 students respectively; while school 'Q' decided to award ₹7,370 for the two games to 4 and 3 students respectively.

Q78. CBSE 2023 · 1 mark Represent the following information algebraically (in terms of x and y).

Q79. CBSE 2023 · 1 mark Two schools 'P' and 'Q' decided to award prizes to their students for two games of Hockey ₹ x per student and Cricket ₹ y per student. School 'P' decided to award a total of ₹9,500 for the two games to 5 and 4 students respectively; while school 'Q' decided to award ₹7,370 for the two games to 4 and 3 students respectively. Represent the following information algebraically (in terms of x and y).

4 Quadratic Equations

Notes & MCQs →

MULTIPLE CHOICE AND ASSERTION-REASON (31)

Q1. CBSE 2026 · 1 mark The value of k for which the equation $2kx^2 - 6x + 3 = 0$ has real and equal roots, is:

- (a) $3/2$ (b) $1/2$ (c) $-3/2$ (d) 2

Q2. CBSE 2026 · 1 mark The value of k for which the equation $5x^2 - 2x + k = 0$ has equal real roots, is:

- (a) 5 (b) $-1/5$ (c) $1/5$ (d) 0

Q3. CBSE 2026 · 1 mark The roots of the quadratic equation $x^2 + 9 = 0$ are

- (a) real and equal (b) not real
(c) real and negative of each other (d) rational numbers

Q4. CBSE 2026 · 1 mark The value of k for which the equation $kx^2 - 6x - 4 = 0$ has real and equal roots, is

- (a) $9/4$ (b) -4 (c) $-9/4$ (d) -2

Q5. CBSE 2026 · 1 mark The value of p for which roots of the quadratic equation $x^2 - px + 6 = 0$ are rational, is

- (a) 1 (b) -5 (c) 25 (d) 5

Q6. CBSE 2026 · 1 mark The discriminant of the quadratic equation $x^2 - 3x - 2 = 0$ is:

- (a) 1 (b) 17 (c) -1 (d) -17

Q7. CBSE 2026 · 1 mark The equation $x + 1/x = 3$ ($x \neq 0$) is expressed as a quadratic equation in the form of $ax^2 + bx + c = 0$. The value of $a - b + c$ is:

- (a) 5 (b) 2 (c) 1 (d) -1

Q8. CBSE 2026 · 1 mark The discriminant of the quadratic equation $x^2 - 5x + 6 = 0$ is:

- (a) 1 (b) -1 (c) 49 (d) 7

Q9. CBSE 2026 · 1 mark The discriminant of the quadratic equation $2x^2 - 3x - 5 = 0$ is:

- (a) -31 (b) 49 (c) 7 (d) -9

Q10. CBSE 2026 · 1 mark $ax^2 + 3x + 1 = 0$ has real and equal roots is:

- (a) $a = 9/4$ (b) $a = 4/9$ (c) $a = 3/4$ (d) $a = 4/3$

Q11. CBSE 2026 · 1 mark Which of the following equations is a quadratic equation?

- (a) $x^2 = (x + 1)^2$ (b) $(x - 1)(x + 2) = 2x + 1$
(c) $(x + 2)^3 = 2x(x^2 - 1)$ (d) $x^3/x = x^2$

Q12. CBSE 2026 · 1 mark The value of p for which $px^2 + 4x + p = 0$ has real and equal roots is:

- (a) 4 (b) -4 (c) 2 (d) 0

Q13. CBSE 2026 · 1 mark Assertion (A): Every quadratic equation has two real roots. Reason (R): A quadratic polynomial can have at most two zeroes. Select the correct answer from the codes: (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A). (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A). (C) Assertion (A) is true, but Reason (R) is false. (D) Assertion (A) is false, but Reason (R) is true.

- (a) (A) (b) (B) (c) (C) (d) (D)



Q14. CBSE 2026 · 1 mark Assertion (A): Every quadratic equation has two real roots. Reason (R): A quadratic polynomial can have at most two zeroes. Select the correct answer from the codes given.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
 (b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
 (c) Assertion (A) is true, but Reason (R) is false.
 (d) Assertion (A) is false, but Reason (R) is true.

Q15. CBSE 2026 · 1 mark Assertion (A): Every quadratic equation has two real roots. Reason (R): A quadratic polynomial can have at most two zeroes.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
 (b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
 (c) Assertion (A) is true, but Reason (R) is false.
 (d) Assertion (A) is false, but Reason (R) is true.

Q16. CBSE 2025 · 1 mark The quadratic equation whose roots are 7 and $1/7$ is:

- (a) $7x^2 - 50x + 7 = 0$ (b) $7x^2 - 50x + 1 = 0$
 (c) $7x^2 + 50x - 7 = 0$ (d) $7x^2 + 50x - 1 = 0$

Q17. CBSE 2025 · 1 mark A quadratic equation whose roots are α and $1/\alpha$ respectively is:

- (a) $ax^2 - ax + 1 = 0$ (b) $ax^2 - a^2x + 1 = 0$
 (c) $ax^2 + ax + 1 = 0$ (d) $ax^2 + a^2x - 1 = 0$

Q18. CBSE 2025 · 1 mark If $(x-6)/(x-3) = 0$, then the values of x are:

- (a) ± 6 (b) ± 4 (c) ± 12 (d) ± 3

Q19. CBSE 2024 · 1 mark The roots of the quadratic equation $x^2 + x - p(p+1) = 0$ are:

- (a) $p, p+1$ (b) $-p, p+1$ (c) $-p, -(p+1)$ (d) $p, -(p+1)$

Q20. CBSE 2024 · 1 mark The quadratic equation $x^2 + x + 1 = 0$ has _____ roots.

- (a) real and equal (b) irrational (c) real and distinct
 (d) not-real

Q21. CBSE 2024 · 1 mark Value of k for which $x = 2$ is a solution of the equation $5x^2 - 4x + (2+k) = 0$, is

- (a) 10 (b) -10 (c) 14 (d) -14

Q22. CBSE 2024 · 1 mark The roots of the quadratic equation $4x^2 - 5x + 4 = 0$ are

- (a) irrational (b) rational and distinct (c) not real
 (d) rational and equal

Q23. CBSE 2024 · 1 mark If the discriminant of the quadratic equation $3x^2 - 2x + c = 0$ is 16, then the value of c is:

- (a) 1 (b) 0 (c) -1 (d) 2

Q24. CBSE 2024 · 1 mark If $y = 1$ is one of the solutions of the quadratic equation $py^2 + py + 3 = 0$, then the value of p is:

- (a) -3 (b) 2 (c) -3/2 (d) -2

Q25. CBSE 2024 · 1 mark The ratio of the sum and product of the roots of the quadratic equation $5x^2 - 6x + 21 = 0$ is:

- (a) 5 : 21 (b) 2 : 7 (c) 21 : 5 (d) 7 : 2

Q26. CBSE 2024 · 1 mark If the quadratic equation $ax^2 + bx + c = 0$ has real and equal roots, then the value of c is:

- (a) a^2/b (b) $-a^2/b$ (c) a^4/b^2 (d) $-a^4/b^2$

Q27. CBSE 2024 · 1 mark Which of the following quadratic equations has -1 as a root?

- (a) $x^2 - 4x - 5 = 0$ (b) $-x^2 - 4x + 5 = 0$ (c) $x^2 + 3x + 4 = 0$
 (d) $x^2 - 5x + 6 = 0$

Q28. CBSE 2023 · 1 mark Which of the following quadratic equations has sum of its roots as 4?

- (a) $2x^2 - 4x + 8 = 0$ (b) $x^2 + 4x + 4 = 0$ (c) $2x^2 - 24x + 1 = 0$
 (d) $4x^2 - 4x + 4 = 0$

Q29. CBSE 2023 · 1 mark The roots of the equation $x^2 + 3x - 10 = 0$ are:

- (a) 2, -5 (b) -2, 5 (c) 2, 5 (d) -2, -5

Q30. CBSE 2023 · 1 mark A quadratic equation whose roots are $(2 + \sqrt{3})$ and $(2 - \sqrt{3})$ is:

- (a) $x^2 - 4x + 1 = 0$ (b) $x^2 + 4x + 1 = 0$ (c) $4x^2 - 3 = 0$
 (d) $x^2 - 1 = 0$

Q31. CBSE 2023 · 1 mark A quadratic equation whose roots are $(3 - \sqrt{2})$ and $(3 + \sqrt{2})$ is:

- (a) $x^2 - 6x + 7 = 0$ (b) $x^2 + 6x + 7 = 0$ (c) $9x^2 - 2 = 0$
 (d) $x^2 - 7 = 0$

VERY SHORT ANSWER (6)

Q32. CBSE 2025 · 2 marks For what value of k does the quadratic equation $4x^2 + kx + 1 = 0$ have real and equal roots?

Q33. CBSE 2025 · 2 marks (a) $4x^2 + kx + 1 = 0$ has real and equal roots. OR (b) If α and β are zeroes of $p(y) = y^2 - 5y + 3$, then find the value of $4/\alpha^3 + 3/\beta^4$.

Q34. CBSE 2023 · 2 marks Find the sum and product of the roots of the quadratic equation $2x^2 - 9x + 4 = 0$.

Q35. CBSE 2023 · 2 marks (A) Find the sum and product of the roots of the quadratic equation $2x^2 - 9x + 4 = 0$. OR (B) Find the discriminant of the quadratic equation $4x^2 - 5 = 0$ and hence comment on the nature of roots of the equation.

Q36. CBSE 2022 · 2 marks For what value of m, the quadratic equation $mx^2 - 2(m-1)x + (m+2) = 0$ has two real and equal roots?

Q37. CBSE 2022 · 2 marks Find the nature of the roots of the quadratic equation $x^2 - 5x + 9 = 0$.

SHORT ANSWER (9)

Q38. CBSE 2024 · 3 marks Three consecutive integers are such that sum of the square of second and product of other two is 161. Find the three integers.

Q39. CBSE 2023 · 3 marks Find the value of 'p' for which the quadratic equation $px(x-2) + 6 = 0$ has two equal real roots.



Q40. CBSE 2023 · 3 marks Find the value of 'p' for which one root of the quadratic equation $px^2 - 14x + 8 = 0$ is 6 times the other.

Q41. CBSE 2022 · 2 marks Find the value of m for which the quadratic equation $(m - 1)x^2 + 2(m - 1)x + 1 = 0$ has two real and equal roots.

Q42. CBSE 2022 · 2 marks Rohan's father is 5 years older than Rohan's mother. Rohan's mother is 3 times as old as Rohan. The product of Rohan's mother's age 5 years from now and Rohan's age 7 years from now is one more than twice his present age. Find his present age.

Q43. CBSE 2022 · 2 marks Solve the quadratic equation for x: $x^2 - 2ax - (4b^2 - a^2) = 0$

Q44. CBSE 2022 · 2 marks Solve the quadratic equation $2x^2 - 5x - 1 = 0$ for x.

Q45. CBSE 2022 · 2 marks Solve the quadratic equation $x^2 + 3x - 9 = 0$ for x.

Q46. CBSE 2022 · 2 marks For what value of p, does the quadratic equation $px^2 + 2x + p = 0$ have real and equal roots?

LONG ANSWER (24)

Q47. CBSE 2026 · 5 marks ABCD is a rectangle of dimensions 80 cm × 60 cm. Another rectangle PQRS is drawn inside ABCD leaving space of equal width x cm along the edges of ABCD. If area PQRS is half of the area ABCD, then find the value of x.

Q48. CBSE 2026 · 5 marks (a) ABCD is a rectangle of dimensions 80 cm × 60 cm. Another rectangle PQRS is drawn inside ABCD leaving space of equal width x cm along the edges of ABCD. If area PQRS is half of the area ABCD, then find the value of x. OR (b) A train covers a distance of 90 km at a uniform speed. Had the speed been 15 km/h more, it would have taken 30 minutes less for the same journey. Find the original speed of the train.

Q49. CBSE 2026 · 5 marks The sum of numerator and denominator of a fraction is 4 less than twice the denominator. If each of the numerator and denominator is decreased by 1, the fraction becomes $\frac{1}{3}$. Find the fraction.

Q50. CBSE 2026 · 5 marks Solve for x: $\frac{(x - 2)}{(x - 3)} + \frac{(x - 4)}{(x - 5)} = \frac{10}{3}$; $x \neq 3, 5$

Q51. CBSE 2026 · 5 marks (a) The difference of the squares of two positive numbers is 180. The square of the smaller number is 8 times the greater number. Find the two numbers. OR (b) Find the value(s) of k for which the equation $2x^2 + kx + 3 = 0$ has real and equal roots. Hence, find the roots of the equations so obtained.

Q52. CBSE 2026 · 5 marks The difference of the squares of two positive numbers is 180. The square of the smaller number is 8 times the greater number. Find the two numbers.

Q53. CBSE 2026 · 5 marks (a) The sum of areas of two squares is 2650 cm^2 . If the sum of their perimeters is 280 cm, find the sides of the two given squares.

Q54. CBSE 2026 · 5 marks (a) The sum of areas of two squares is 2650 cm^2 . If the sum of their perimeters is 280 cm, find the sides of the two given squares. OR (b) Express the equation $(x - 0, 2)$ as a quadratic equation in standard form. Hence, find the roots of the quadratic equation so obtained.

Q55. CBSE 2026 · 5 marks Find two consecutive odd integers, sum of whose squares is 290.

Q56. CBSE 2025 · 5 marks (a) The perimeter of a right triangle is 60 cm and its hypotenuse is 25 cm. Find the lengths of other two sides of the triangle. OR (b) A train travels a distance of 480 km at a uniform speed. If the speed had been 8 km/h less, then it would have taken 3 hours more to cover the same distance. Find the speed of the train.

Q57. CBSE 2025 · 5 marks A two-digit number is such that the product of its digits is 12. When 36 is added to this number, the digits interchange their places. Find the number.

Q58. CBSE 2025 · 5 marks The perimeter of a right triangle is 60 cm and its hypotenuse is 25 cm. Find the lengths of other two sides of the triangle.

Q59. CBSE 2025 · 5 marks The sum of the areas of two squares is 52 cm^2 and difference of their perimeters is 8 cm. Find the lengths of the sides of the two squares.

Q60. CBSE 2025 · 5 marks (a) The numerator of a fraction is 3 less than its denominator. If 2 is added to both numerator and denominator, then the sum of the new fraction and the original fraction is $\frac{29}{20}$. Find the original fraction.

Q61. CBSE 2024 · 5 marks The sum of two numbers is 18 and the sum of their reciprocals is $\frac{1}{4}$. Find the numbers.

Q62. CBSE 2024 · 5 marks In a flight of 2800 km, an aircraft was slowed down due to bad weather. Its average speed is reduced by 100 km/h and by doing so, the time of flight is increased by 30 minutes. Find the original duration of the flight.

Q63. CBSE 2024 · 5 marks (a) A train travels a distance of 90 km at a constant speed. Had the speed been 15 km/h more, it would have taken 30 minutes less for the journey. Find the original speed of the train. OR (b) Find the value of 'c' for which the quadratic equation $(c + 1)x^2 - 6(c + 1)x + 3(c + 9) = 0$; $c \neq -1$ has real and equal roots.

Q64. CBSE 2024 · 5 marks (a) Find the value of 'k' for which the quadratic equation $(k + 1)x^2 - 2(3k + 1)x + (8k + 1) = 0$ has real and equal roots.

Q65. CBSE 2024 · 5 marks (a) A train travels a distance of 90 km at a constant speed. Had the speed been 15 km/h more, it would have taken 30 minutes less for the journey. Find the original speed of the train.

Q66. CBSE 2024 · 5 marks (a) Find the value of 'k' for which the quadratic equation $(k + 1)x^2 - 6(k + 1)x + 3(k + 9) = 0$, $k \neq -1$ has real and equal roots.

Q67. CBSE 2024 · 5 marks A 2-digit number is such that the product of the digits is 14. When 45 is added to the number, the digits are reversed. Find the number.

Q68. CBSE 2024 · 5 marks A cottage industry produces a certain number of pottery articles in a day. It was observed that on a particular day that the cost of production of each article (in rupees) was 3 more than twice the number of articles produced on that day. If the total cost of production on that day was ₹ 90, find the number of articles produced and the cost of each article.



Q69. CBSE 2023 · 5 marks A train travels at a certain average speed for a distance of 54 km and then travels a distance of 63 km at an average speed of 6 km/h more than the first speed. If it takes 3 hours to complete the journey, what was its first average speed?

Q70. CBSE 2023 · 5 marks (a) A train travels at a certain average speed for a distance of 54 km and then travels a distance of 63 km at an average speed of 6 km/h more than the first speed. If it takes 3 hours to complete the journey, what was its first average speed? OR (b) Two pipes together can fill a tank in $\frac{8}{15}$ hours. The pipe with larger diameter takes 2 hours less than the pipe with smaller diameter to fill the tank separately. Find the time in which each pipe can fill the tank separately.

CASE-BASED (3)

CASE STUDY · CBSE 2025

A garden designer is planning a rectangular lawn that is to be surrounded by a uniform walkway. The total area of the lawn

and the walkway is 360 square metres. The width of the walkway is same on all sides. The dimensions of the lawn itself are 12 metres by 10 metres.

Q71. CBSE 2025 · 1 mark Formulate the quadratic equation representing the total area of the lawn and the walkway, taking width of walkway = x m.

CASE STUDY · CBSE 2024

A ball is thrown in the air so that t seconds after it is thrown, its height h metre above its starting point is given by the polynomial $h = 25t - 5t^2$.

Q72. CBSE 2024 · 1 mark Write zeroes of the given polynomial.

Q73. CBSE 2024 · 2 marks After throwing upward, how much time did the ball take to reach to the height of 30 m?

5 Arithmetic Progressions

Notes & MCQs →

MULTIPLE CHOICE AND ASSERTION-REASON (43)

Q1. CBSE 2026 · 1 mark The sum of first n terms of an A.P. is 502. If the first and the last terms are 2 and 192 respectively, then the value of n is:

- (a) 10 (b) 5 (c) 15 (d) 20

Q2. CBSE 2026 · 1 mark n th term of an A.P. is $5n - 15$. The common difference of the A.P. is:

- (a) $5n$ (b) 5 (c) -5 (d) 10

Q3. CBSE 2026 · 1 mark n th term of the A.P.: $\frac{4}{3}, -\frac{1}{3}, 3, \dots$ is

- (a) $\frac{9}{3} - 5n$ (b) $\frac{6}{3} - 5n$ (c) $\frac{4}{3} - 3n$ (d) $\frac{2}{3} + 3n$

Q4. CBSE 2026 · 1 mark If $-26, x, 2$ are in A.P., then the value of x is

- (a) 14 (b) -13 (c) -12 (d) -14

Q5. CBSE 2026 · 1 mark If $\frac{16}{9}, -\frac{2}{9}, -\frac{20}{9}, \dots$ are in A.P., then next term of the sequence is

- (a) $\frac{32}{9}$ (b) $\frac{46}{9}$ (c) $\frac{2}{9}$ (d) $\frac{34}{9}$

Q6. CBSE 2026 · 1 mark If 14th term of an A.P. is 4 and its 15th term is zero, then its first term is

- (a) -48 (b) -56 (c) 56 (d) 48

Q7. CBSE 2026 · 1 mark The 31st term of the A.P. : $-\frac{5}{6}, -\frac{3}{4}, -\frac{2}{3}, -\frac{7}{12}, \dots$ is

- (a) $-\frac{5}{3}$ (b) $\frac{5}{3}$ (c) $\frac{12}{20}$ (d) $-\frac{12}{20}$

Q8. CBSE 2026 · 1 mark If a, b, c and d are consecutive terms of an A.P., then $c - b$ is equal to :

- (a) $d - a$ (b) $d - b$ (c) $d - c$ (d) $c - a$

Q9. CBSE 2026 · 1 mark The n th term of an A.P. is $3n + 2$. The common difference is:

- (a) 8 (b) 2 (c) 5 (d) 3

Q10. CBSE 2026 · 1 mark If a_n represents n th term of the A.P. $-\frac{15}{4}, -\frac{10}{4}, -\frac{5}{4}, \dots$ then value of $a_{16} - a_{12}$ is

- (a) 4 (b) $\frac{5}{4}$ (c) 5 (d) $\frac{25}{4}$

Q11. CBSE 2025 · 1 mark If the sum of first m terms of an AP is $2m^2 + 3m$, then its second term is:

- (a) 10 (b) 9 (c) 12 (d) 4

Q12. CBSE 2025 · 1 mark The 11th and 13th term of an AP are 39 and 45, respectively. What is the common difference of the AP?

- (a) 42 (b) 21 (c) 6 (d) 3

Q13. CBSE 2025 · 1 mark The 10th term of the AP $5, \frac{7}{2}, 4, \frac{5}{2}, \dots$ is:

- (a) $-\frac{5}{2}$ (b) $-\frac{1}{2}$ (c) $\frac{1}{2}$ (d) $\frac{5}{2}$

Q14. CBSE 2025 · 1 mark Assertion (A): Common difference of the AP: $5, 1, -3, -7, \dots$ is -4 . Reason (R): Common difference of the AP: $a_1, a_2, a_3, \dots, a_n$ is obtained by $d = a_n - a_{n-1}$.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q15. CBSE 2025 · 1 mark The 9th term from the end (towards first term) of the AP

- (a) 135 (b) 125 (c) 115 (d) 39

Q16. CBSE 2025 · 1 mark Assertion (A): Common difference of the AP: $5, 1, -3, \dots$ is 4. Reason (R): Common difference of the AP: $a_1, a_2, a_3, \dots, a_n$ is obtained by $d = a_n - a_{n-1}$.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q17. CBSE 2025 · 1 mark The 10th term of the AP $5, \dots, \dots, 10$

- (a) Option A (b) Option B (c) Option C (d) Option D



Q18. CBSE 2024 · 1 mark The sum of the first three terms of an AP is 30 and the sum of the last three terms is 36. If the first term is 9, then the number of terms is:

- (a) 10 (b) 5 (c) 6 (d) 13

Q19. CBSE 2024 · 1 mark Assertion (A): The sum of the first fifteen terms of the AP 21, 18, 15, 12, ... is zero. Reason (R): The sum of the first n terms of an AP with first term 'a' and common difference 'd' is given by $S_n = n/2 [a + (n - 1) d]$.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
 (b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
 (c) Assertion (A) is true, but Reason (R) is false.
 (d) Assertion (A) is false, but Reason (R) is true.

Q20. CBSE 2024 · 1 mark The common difference of an A.P. in which $a_{15} - a_{11} = 48$, is

- (a) 12 (b) 16 (c) -12 (d) -16

Q21. CBSE 2024 · 1 mark Which term of the A.P. -29, -26, -23, ..., 61 is 16?

- (a) 11th (b) 16th (c) 10th (d) 31st

Q22. CBSE 2024 · 1 mark The sum of first 200 natural numbers is

- (a) 2010 (b) 2000 (c) 20100 (d) 21000

Q23. CBSE 2024 · 1 mark The common difference of an A.P. in which $a_{20} - a_{15} = 20$, is

- (a) 4 (b) 5 (c) 4d (d) 5d

Q24. CBSE 2024 · 1 mark The common difference of the A.P. $1/(2x)$, $(1 - 4x)/(2x)$, $(1 - 8x)/(2x)$, ... is:

- (a) $-2x$ (b) -2 (c) 2 (d) $2x$

Q25. CBSE 2024 · 1 mark If the mean of five observations x , $x + 2$, $x + 4$, $x + 6$ and $x + 8$ is 11, then the value of x is:

- (a) 4 (b) 7 (c) 11 (d) 6

Q26. CBSE 2024 · 1 mark If the sum of first n terms of an A.P. is $3n^2 + 4n$ and its common difference is 6, then its first term is:

- (a) 7 (b) 4 (c) 6 (d) 3

Q27. CBSE 2024 · 1 mark The common difference of the A.P. $1/(12x)$, $(1 - 4x)/(2x)$, $(1 - 8x)/(2x)$, ... is:

- (a) $-2x$ (b) -2 (c) 2 (d) $2x$

Q28. CBSE 2024 · 1 mark Three numbers in A.P. have the sum 30. What is its middle term?

- (a) 4 (b) 10 (c) 16 (d) 8

Q29. CBSE 2024 · 1 mark If the first three terms of an A.P. are $3p - 1$, $3p + 5$, $5p + 1$ respectively; then the value of p is:

- (a) 2 (b) -3 (c) 4 (d) 5

Q30. CBSE 2024 · 1 mark The next (4th) term of the A.P. 98, 50, 18 ... is:

- (a) 128 (b) 140 (c) 162 (d) 200

Q31. CBSE 2024 · 1 mark The number of terms in the A.P. 3, 6, 9, 12, ..., 111 is:

- (a) 36 (b) 40 (c) 37 (d) 30

Q32. CBSE 2024 · 1 mark The next (4th) term of the A.P. ..., 63, 28, 7 is:

- (a) 70 (b) 84 (c) 97 (d) 112

Q33. CBSE 2024 · 1 mark If the mean of the first n natural numbers is $9n/5$, then the value of n is:

- (a) 5 (b) 4 (c) 9 (d) 10

Q34. CBSE 2024 · 1 mark The 14th term from the end of the A.P. - 11, -8, -5, ..., 49 is:

- (a) 7 (b) 10 (c) 13 (d) 28

Q35. CBSE 2024 · 1 mark If the first term of an AP is -3 and common difference -2, then the seventh term is

- (a) -9 (b) 9 (c) -17 (d) -15

Q36. CBSE 2023 · 1 mark The next term of the A.P. : 6, 24, 54 is :

- (a) 60 (b) 96 (c) 72 (d) 216

Q37. CBSE 2023 · 1 mark Assertion (A): a , b , c are in A.P. if and only if $2b = a + c$. Reason (R): The sum of first n odd natural numbers is n^2 .

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
 (b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A).
 (c) Assertion (A) is true but Reason (R) is false.
 (d) Assertion (A) is false but Reason (R) is true.

Q38. CBSE 2023 · 1 mark If $k + 2$, $4k - 6$ and $3k - 2$ are three consecutive terms of an A.P., then the value of k is:

- (a) 3 (b) -3 (c) 4 (d) -4

Q39. CBSE 2023 · 1 mark The next term of the A.P. : 7, 28, 63 is :

- (a) 70 (b) 80 (c) 97 (d) 112

Q40. CBSE 2023 · 1 mark The common difference of the A.P. whose n th term is given by $a_n = 3n + 7$, is :

- (a) 7 (b) 3 (c) $3n$ (d) 1

Q41. CBSE 2023 · 1 mark The 11th term from the end of the A.P. : 10, 7, 4, ..., -62 is :

- (a) 25 (b) 16 (c) -32 (d) 0

Q42. CBSE 2023 · 1 mark The 13th term from the end of the A.P. : 20, 13, 6, 1, ..., 148 is:

- (a) 57 (b) -57 (c) 64 (d) -64

Q43. CBSE 2023 · 1 mark The common difference of the A.P. whose n th term is given by $a_n = 5n - 7$ is:

- (a) -7 (b) 7 (c) 5 (d) 2

VERY SHORT ANSWER (2)

Q44. CBSE 2026 · 2 marks The sum of first n terms of an A.P. is given by $S_n = 4n^2 - n$. Find the 25th term of this A.P.

Q45. CBSE 2022 · 2 marks In which term are the 5th terms of the APs: 9, 7, 5, ... and 15, 12, 9, ... the same?

SHORT ANSWER (26)

Q46. CBSE 2026 · 3 marks In an A.P., it is given that $a = 2$, $d = 8$ and $S_n = 90$. Find the value of n .



Q47. CBSE 2026 · 3 marks (a) How many terms of the A.P. 3, 5, 7, 9, ... must be added to get the sum 80? OR (b) Find three consecutive terms in A.P. whose sum is 21 and their product is 231.

Q48. CBSE 2026 · 3 marks The 4th and 10th term of an A.P. are 13 and 25 respectively. Find its 24th term.

Q49. CBSE 2026 · 3 marks In an A.P., 15th term exceeds the 8th term by 21. If sum of first 10 terms is 55, then form the A.P.

Q50. CBSE 2025 · 3 marks A sum of ₹2,000 is invested at 7% per annum simple interest. Calculate the interests at the end of 1st, 2nd and 3rd year. Do these interests form an AP? If so, find the interest at the end of the 27th year.

Q51. CBSE 2025 · 3 marks Find the sum of all 3-digit natural numbers which are divisible by 11.

Q52. CBSE 2024 · 3 marks If the sum of first m terms of an A.P. is same as sum of its first n terms ($m \neq n$), then show that the sum of its first $(m + n)$ terms is zero.

Q53. CBSE 2024 · 3 marks If the sum of first 7 terms of an A.P. is 49 and that of first 17 terms is 289, find the sum of its first 20 terms.

Q54. CBSE 2024 · 3 marks A man starts his job with a certain monthly salary and earns a fixed increment every year. If his salary was ₹15,000 after 4 years of service and ₹18,000 after 10 years of service, what was his starting salary and what was the annual increment?

Q55. CBSE 2024 · 3 marks (a) If the sum of the first 14 terms of an A.P. is 1050 and the first term is 10, then find the 20th term and the n th term.

Q56. CBSE 2023 · 3 marks How many terms are there in an A.P. whose first and fifth terms are -14 and 2 , respectively and the last term is 62 .

Q57. CBSE 2023 · 3 marks (A) The sum of first 15 terms of an A.P. is 750 and its first term is 15 . Find its 20th term. OR (B) Rohan repays his total loan of ₹1,18,000 by paying every month starting with the first instalment of ₹1,000. If he increases the instalment by ₹100 every month, what amount will be paid by him in the 30th instalment? What amount of loan has he paid after 30th instalment?

Q58. CBSE 2023 · 3 marks How many terms are there in A.P. whose first and fifth term are -14 and 2 , respectively and the last term is 62 .

Q59. CBSE 2023 · 3 marks If p th term of an A.P. is q and q th term is p , then prove that its n th term is $(p + q - n)$.

Q60. CBSE 2023 · 3 marks In an A.P., the sum of the first n terms is given by $S_n = 6n - n^2$. Find its 30th term.

Q61. CBSE 2023 · 3 marks Find the common difference of an A.P. whose first term is 8 , the last term is 65 and the sum of all its terms is 730 .

Q62. CBSE 2022 · 2 marks Find the sum of first 30 terms of AP: $30, 24, 18, \dots$

Q63. CBSE 2022 · 2 marks Find the sum of the first twelve 2-digit numbers which are multiples of 6 .

Q64. CBSE 2022 · 2 marks Find the sum of first 20 terms of an AP in which $d = 5$ and $a_{20} = 135$.

Q65. CBSE 2022 · 2 marks For which value of n are the n th terms of the APs: $9, 7, 5, \dots$ and $15, 12, 9, \dots$ the same?

Q66. CBSE 2022 · 2 marks In an AP, the sum of the first 10 terms is 1505 . Find the common difference if the sum of the first 14 terms is 1505 .

Q67. CBSE 2022 · 2 marks Which terms of the APs: $9, 7, 5, \dots$ and $15, 12, 9, \dots$ are the same?

Q68. CBSE 2022 · 2 marks In an AP, if $a = 50$, $d = -4$ and $S_n = 0$, then find the value of n .

Q69. CBSE 2022 · 2 marks For an AP with common difference 6 , the sum of first ten terms is same as four times the sum of first five terms. Determine the first term of the AP.

Q70. CBSE 2022 · 2 marks Find the 15th term of an AP whose first term is 17 and fourth term is 44 .

Q71. CBSE 2022 · 2 marks Find the 8th term of an AP whose first term is 24 and 11th term is 21 .

LONG ANSWER (7)

Q72. CBSE 2026 · 5 marks The third and ninth term of an A.P. are 4 and -8 respectively. (i) Which term of the A.P. is zero? (ii) Find the value of n if $S_n = -36$.

Q73. CBSE 2025 · 5 marks The sum of the third term and the seventh term of an AP is 6 and their product is 8 . Find the sum of the first sixteen terms of the AP.

Q74. CBSE 2025 · 5 marks The n th term is 4 and the common difference is 2 . Also, find the sum of the first 20 terms.

Q75. CBSE 2025 · 5 marks (a) The sum of the third term and the seventh term of an AP is 6 and their product is 8 . Find the sum of the first sixteen terms of the AP. OR (b) The minimum age of children eligible to participate in a painting competition is 8 years. It is observed that the age of the youngest boy was 8 years and the ages of the participants, when seated in order of age, have a common difference of 4 months. If the sum of the ages of all the participants is 168 years, find the age of the eldest participant in the painting competition.

Q76. CBSE 2023 · 5 marks How many terms of the arithmetic progression $45, 39, 33, \dots$ must be taken so that their sum is 180 ? Explain the double answer.

Q77. CBSE 2023 · 5 marks Solve the equation for x : $1 + 4 + 7 + 10 + \dots + x = 287$

Q78. CBSE 2023 · 5 marks Perna saves ₹32 during the first month, ₹36 in the second month and ₹40 in the third month. If she continues to save in this manner, in how many months will she save ₹2,000?

CASE-BASED (11)

CASE STUDY · CBSE 2026

A friend of you wants to buy an electric car for which he plans to take a loan from a bank and plans to pay the total loan and the interest = ₹ 5,90,000, by paying every month starting with



the first instalment of ₹ 5,000. He increases the instalment by ₹ 500 every month.

Q79. CBSE 2026 · 4 marks What are the first three instalments paid by him ?

CASE STUDY · CBSE 2026

The best athlete of your school wants to participate in a 300 m race in a state championship. Presently he can run that distance in 60 seconds but is confident that with each day of practice it will take him 3 seconds less than the previous day. So, first day he will take 60 seconds, 2nd day 57 seconds, third day 54 seconds and so on, to complete the race. He wants to do it in 30 seconds.

Q80. CBSE 2026 · 4 marks Write the first five terms of time and show that it forms an A.P.

CASE STUDY · CBSE 2026

In a garden, saplings of rose flowers were planted at equal intervals to form a spiral pattern. The spiral is made up of successive semicircles, with centres alternatively at A and B, starting with centre at A, of radii 50 cm, 100 cm, 150 cm, ... Spiral 1 has 10 flowers, Spiral 2 has 20 flowers, Spiral 3 has 30 flowers and so on.

Q81. CBSE 2026 · 1 mark What is the radius of the 13th spiral?

CASE STUDY · CBSE 2026

A woman borrowed ₹10,00,000 from her friend and promised to return the borrowed money in monthly instalments beginning from the next month. After one month, she returned ₹10,000, the next month she returned ₹15,000, the third month she returned ₹20,000 and so on, thereby increasing the monthly instalment uniformly.

Q82. CBSE 2026 · 1 mark (i) Find the amount of instalment paid in the tenth month.

CASE STUDY · CBSE 2026

In a society, a yoga instructor was hired to train the people of the society to live a healthy lifestyle. Yoga sessions were held daily from 5 p.m. to 7 p.m. in the society park. On day one, 5 people joined the yoga session, on day two, 3 more people joined, on day three, another 3 people joined and in this manner every next day, 3 more people kept on joining.

Q83. CBSE 2026 · 1 mark On which day did 59 people join the yoga session?

CASE STUDY · CBSE 2025

A school is organizing a charity run to raise funds for a local hospital. The run is planned as a series of rounds around a track, with each round being 300 metres. To make the event more challenging and engaging, the organizers decide to increase the distance of each subsequent round by 50 metres. For example, the second round will be 350 metres, the third round will be 400 metres and so on. The total number of rounds planned is 10.

Q84. CBSE 2025 · 1 mark Write the fourth, fifth and sixth term of the Arithmetic Progression so formed.

CASE STUDY · CBSE 2024

A road roller is a compactor-type engineering vehicle, used to compact soil, gravel, concrete, etc, in the construction of roads and foundations. They are also used at landfills or in agriculture. A company started making road rollers 10 years ago and increased its production uniformly by a fixed number every year. The company produces 800 rollers in the 6th year and 1130 rollers in the 9th year.

Q85. CBSE 2024 · 4 marks (i) What is the company's production in the first year?

CASE STUDY · CBSE 2024

Treasure Hunt is an exciting and adventurous game where participants follow a series of clues/numbers/maps to discover hidden treasures. Players engage in a thrilling quest, solving puzzles and riddles to unveil the location of the coveted prize. While playing a treasure hunt game, some clues (numbers) are hidden in various spots collectively forming an A.P. If the number on the n th spot is $20 + 4n$, then answer the following questions to help the players in spotting the clues:

Q86. CBSE 2024 · 4 marks (i) Which number is on first spot? (ii) (a) Which spot is numbered as 112? OR (b) What is the sum of all the numbers on the first 10 spots? (iii) Which number is on the $(n - 2)$ th spot?

Q87. CBSE 2024 · 4 marks (i) Which number is on first spot?

Q88. CBSE 2024 · 1 mark While playing a treasure hunt game, some clues (numbers) are hidden in various spots collectively forming an A.P. If the number on the n th spot is $20 + 4n$, which number is on first spot?

CASE STUDY · CBSE 2024

Saving money is a good habit and it should be inculcated in children right from the beginning. Rehan's mother brought a piggy bank for Rehan and puts one ₹5 coin of her savings in the piggy bank on the first day. She increases his savings by one ₹5 coin daily.

Q89. CBSE 2024 · 4 marks (i) How many coins were added to the piggy bank on 8th day?



MULTIPLE CHOICE AND ASSERTION-REASON (25)

Q1. CBSE 2026 · 1 mark Which of the following statements is not always true?

- (a) Two circles are similar
- (b) Two isosceles right triangles are similar
- (c) Two rectangles are similar
- (d) Two equilateral triangles are similar

Q2. CBSE 2026 · 1 mark ABCD is a trapezium in which $AB \parallel DC$ and E, F are points on AD and BC respectively such that $EF \parallel DC$. If $ED = 36$ cm, $BF = 70$ cm and $FC = 30$ cm, then the length of AD is :

- (a) 124 cm (b) 120 cm (c) 110 cm (d) 114 cm

Q3. CBSE 2026 · 1 mark If $DEF \sim PQR$ such that $3 DE = PQ$ and $EF = 6$ cm, then the length of QR is :

- (a) 12 cm (b) 3 cm (c) 2 cm (d) 18 cm

Q4. CBSE 2026 · 1 mark If in a $\triangle ABC$, $AB = 6$ cm and $DE \parallel BC$ such that $AE = \frac{1}{3} AC$, then the length of BD is

- (a) 2 cm (b) 3 cm (c) 4 cm (d) 5 cm

Q5. CBSE 2026 · 1 mark If in two triangles ABC and DEF, $AB/EF = BC/DE = CA/DF$; then

- (a) $DEF \sim BCA$ (b) $DEF \sim CBA$ (c) $ABC \sim DEF$
- (d) $ABC \sim DFE$

Q6. CBSE 2026 · 1 mark In $\triangle ABC$, P is a point on AB and Q is a point on AC such that $PQ \parallel BC$. If $AP : PB = 3 : 2$, then $PQ : BC$ is equal to:

- (a) $3 : 2$ (b) $2 : 5$ (c) $3 : 5$ (d) $5 : 3$

Q7. CBSE 2026 · 1 mark Which of the following is not the criterion for similarity of triangles?

- (a) AAA (b) SSS (c) SAS (d) RHS

Q8. CBSE 2026 · 1 mark Assertion (A): All congruent triangles are similar. Reason (R): In congruent triangles, the ratio of corresponding sides is $1 : 1$.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
- (b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
- (c) Assertion (A) is true, but Reason (R) is false.
- (d) Assertion (A) is false, but Reason (R) is true.

Q9. CBSE 2026 · 1 mark Assertion (A): All congruent triangles are similar. Reason (R): In congruent triangles, the ratio of corresponding sides is $1 : 1$. Select the correct answer from the codes: (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A). (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A). (C) Assertion (A) is true, but Reason (R) is false. (D) Assertion (A) is false, but Reason (R) is true.

- (a) (A) (b) (B) (c) (C) (d) (D)

Q10. CBSE 2026 · 1 mark Which types of triangles are always similar?

- (a) Right-angled triangles (b) Acute-angled triangles
- (c) Isosceles triangles (d) Equilateral triangles

Q11. CBSE 2025 · 1 mark In triangles ABC and DEF, $\angle B = \angle E$, $\angle F = \angle C$ and $AB = 3 DE$. Then, the two triangles are:

- (a) congruent but not similar
- (b) congruent as well as similar
- (c) neither congruent nor similar
- (d) similar but not congruent

Q12. CBSE 2025 · 1 mark The points $(-5, 0)$, $(5, 0)$ and $(0, 4)$ are the vertices of a triangle which is a/an:

- (a) right-angled triangle (b) isosceles triangle
- (c) equilateral triangle (d) scalene triangle

Q13. CBSE 2025 · 1 mark Which of the following statements is incorrect?

- (a) Two congruent figures are always similar.
- (b) A square and a rhombus of the same area are always similar.
- (c) Two equilateral triangles are always similar.
- (d) Two similar triangles need not be congruent.

Q14. CBSE 2025 · 1 mark If in two triangles DEF and PQR, angle D = angle Q and angle R = angle E, then which of the following is not true?

- (a) $DE/PQ = DF/PR$ (b) $EF/QR = DE/PQ$ (c) $DE/QR = DF/PQ$
- (d) $EF/PR = DE/PQ$

Q15. CBSE 2024 · 1 mark If in triangles ABC and PQR, $AB/QR = BC/PR$, then they will be similar, when:

- (a) $\angle B = \angle Q$ (b) $\angle A = \angle R$ (c) $\angle B = \angle R$ (d) $\angle C = \angle Q$

Q16. CBSE 2024 · 1 mark A line l intersects the sides PQ and PR of a $\triangle PQR$ at L and M respectively such that $LM \parallel QR$. If $PL = 5.7$ cm, $PQ = 15.2$ cm and $MR = 5.5$ cm, then the length of PM (in cm) is:

- (a) 3 (b) 1.8 (c) 2.5 (d) 3.3

Q17. CBSE 2024 · 1 mark The perimeters of two similar triangles ABC and PQR are 56 cm and 48 cm respectively. PQ/AB is equal to

- (a) $7/8$ (b) $6/7$ (c) $7/6$ (d) $8/7$

Q18. CBSE 2024 · 1 mark AB and CD are two chords of a circle intersecting at P. Choose the correct statement from the following:

- (a) $\triangle ADP \sim \triangle CBA$ (b) $\triangle ADP \sim \triangle BPC$ (c) $\triangle ADP \sim \triangle BCP$
- (d) $\triangle ADP \sim \triangle CBP$

Q19. CBSE 2024 · 1 mark If the diagonals of a quadrilateral divide each other proportionally, then it is a:

- (a) parallelogram (b) rectangle (c) square (d) trapezium

Q20. CBSE 2024 · 1 mark Assertion (A): A line drawn parallel to any one side of a triangle intersects the other two sides in the same ratio. Reason (R): Parallel lines cannot be drawn to any side of a triangle.

- (a) Both Assertion (A) and Reason (R) are correct and Reason (R) is the correct explanation of Assertion (A).
- (b) Both Assertion (A) and Reason (R) are correct but Reason (R) is not the correct explanation of Assertion (A).
- (c) Assertion (A) is true, but Reason (R) is false.
- (d) Assertion (A) is false, but Reason (R) is true.



Q21. CBSE 2023 · 1 mark If $\triangle ABC \sim \triangle PQR$, $A = 32^\circ$ and $R = 65^\circ$, then the measure of $\angle B$ is:

- (a) 32° (b) 65° (c) 83° (d) 97°

Q22. CBSE 2023 · 1 mark In $\triangle ABC$, $PQ \parallel BC$. If $PB = 6$ cm, $AP = 4$ cm, $AQ = 8$ cm, find the length of AC .

- (a) 12 cm (b) 20 cm (c) 6 cm (d) 14 cm

Q23. CBSE 2023 · 1 mark In triangles ABC and DEF , if $FD \parallel BC$ and $DE \parallel AB$. Which of the following makes the two triangles similar?

- (a) $\angle A = \angle D$ (b) $\angle B = \angle D$ (c) $\angle B = \angle E$ (d) $\angle A = \angle F$

Q24. CBSE 2023 · 1 mark In triangles ABC and DEF , $DE \parallel AB$ and $FD \parallel BC$. Which of the following makes the two triangles similar?

- (a) $\angle A = \angle D$ (b) $\angle B = \angle D$ (c) $\angle B = \angle E$ (d) $\angle A = \angle F$

Q25. CBSE 2023 · 1 mark In triangles ABC and DEF , $\angle F = \angle B$ and $DE/AB = EF/BC$. Which of the following makes the two triangles similar?

- (a) $\angle A = \angle D$ (b) $\angle B = \angle D$ (c) $\angle B = \angle E$ (d) $\angle A = \angle F$

VERY SHORT ANSWER (4)

Q26. CBSE 2026 · 2 marks D is a point on side BC of triangle ABC such that $\angle ADC = \angle BAC$. Prove that $(CA)^2 = CB \cdot CD$.

Q27. CBSE 2026 · 2 marks D is a point on side BC of triangle ABC such that $\angle ADC = \angle BAC$. Prove that $(CA)^2 = CB \cdot CD$.

Q28. CBSE 2025 · 2 marks If $\triangle ABC \sim \triangle PQR$ in which $AB = 6$ cm, $BC = 4$ cm, $AC = 8$ cm and $PR = 6$ cm, then find the length of $(PQ + QR)$.

Q29. CBSE 2024 · 2 marks In a $\triangle ABC$, D and E are points on the sides AB and AC respectively such that $BD = CE$. If $\angle B = \angle C$, then show that $DE \parallel BC$.

SHORT ANSWER (2)

Q30. CBSE 2026 · 3 marks S is any point on the side QR of a triangle PQR such that $\angle PSR = \angle QPR$. Prove that $QR/RS = RP/PS$.

Q31. CBSE 2026 · 3 marks Prove that a rectangle circumscribing a circle is a square.

LONG ANSWER (19)

Q32. CBSE 2026 · 5 marks Prove that, if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.

Q33. CBSE 2026 · 5 marks D is the mid-point of side BC of $\triangle ABC$. CE and BF intersect at O , a point on AD . AD is produced to G such that $OD = DG$. Prove that (i) $OBGC$ is a parallelogram. (ii) $EF \parallel BC$ (iii) $\triangle AEF \sim \triangle ABC$

Q34. CBSE 2026 · 5 marks Prove that: A line through the mid-point of one side of a triangle, parallel to another side, bisects the third side.

Q35. CBSE 2026 · 5 marks Prove the following: Line segment joining mid-points of any two sides of a triangle is parallel to the third side.

Q36. CBSE 2025 · 5 marks (a) The diagonal BD of a parallelogram $ABCD$ intersects the line segment AE at the point F , where E is any point on the side BC . Prove that $DF \cdot EF = FB \cdot FA$. OR (b) In $\triangle ABC$, if $AD \perp BC$ and $AD^2 = BD \cdot DC$, then prove that $\angle BAC = 90^\circ$.

Q37. CBSE 2025 · 5 marks The diagonal BD of a parallelogram $ABCD$ intersects the line segment AE at the point F , where E is any point on the side BC . Prove that $DF \times EF = FB \times FA$.

Q38. CBSE 2025 · 5 marks The perimeter of an isosceles triangle is 32 cm. If each equal side is $\frac{5}{6}$ th of the base, find the area of the triangle.

Q39. CBSE 2024 · 5 marks $ABCD$ is a trapezium with $AB \parallel DC$. AC and BD intersect at E . If $\triangle AED \sim \triangle BEC$, then prove that $AD = BC$.

Q40. CBSE 2024 · 5 marks If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then prove that the other two sides are divided in the same ratio.

Q41. CBSE 2024 · 5 marks State and prove Basic Proportionality theorem.

Q42. CBSE 2024 · 5 marks Through the mid-point M of the side CD of a parallelogram $ABCD$, the line BM is drawn intersecting AC in L and AD produced in E . Prove that $EL = 2BL$.

Q43. CBSE 2024 · 5 marks In $\triangle ABC$, if $AD \perp BC$ and $AD^2 = BD \times DC$, then prove that $\angle BAC = 90^\circ$.

Q44. CBSE 2024 · 5 marks (a) E is a point on the side AD produced of a parallelogram $ABCD$ and BE intersects CD at F . Show that $\triangle ABE \sim \triangle CFB$. OR (b) Sides AB , BC and the median AD of $\triangle ABC$ are respectively proportional to sides PQ , QR and the median PM of another $\triangle PQR$. Prove that $\triangle ABC \sim \triangle PQR$.

Q45. CBSE 2024 · 5 marks (a) E is a point on the side AD produced of a parallelogram $ABCD$ and BE intersects CD at F . Show that $\triangle ABE \sim \triangle CFB$.

Q46. CBSE 2023 · 5 marks Sides AB and BC and median AD of a triangle ABC are respectively proportional to sides PQ and QR and median PM of another triangle PQR . Show that $\triangle ABC \sim \triangle PQR$.

Q47. CBSE 2023 · 5 marks Sides AB and BC and median AD of a triangle ABC are respectively proportional to sides PQ and QR and median PM of triangle PQR . Show that $\angle ABC \sim \angle PQR$.

Q48. CBSE 2023 · 5 marks D is a point on the side BC of a triangle ABC such that $\angle ADC = \angle BAC$, prove that $CA^2 = CB \cdot CD$

Q49. CBSE 2023 · 5 marks In a $\triangle PQR$, N is a point on PR , such that $QN \perp PR$. If $PN \times NR = QN^2$, prove that $\angle PQR = 90^\circ$.

Q50. CBSE 2023 · 5 marks A triangle ABC is drawn to circumscribe a circle of radius 4 cm such that the segments BD and DC are of lengths 10 cm and 8 cm respectively. Find the lengths of the sides AB and AC , if the area of triangle ABC is 90 cm^2 .

CASE-BASED (3)

CASE STUDY · CBSE 2026

In a circular museum hall of radius 14 m, some statues are displayed. Statues are kept inside the inner concentric circle of



radius 7 m. One such statue lying in sector OAB, is fenced along line segments OA, AP, PB and BO where P is a point on outer circle.

Q51. CBSE 2026 · 1 mark Prove that $\triangle OAP \cong \triangle OBP$.

Q52. CBSE 2024 · 1 mark Assertion (A): ABCD is a trapezium with $DC \parallel AB$. E and F are points on AD and BC respectively, such that $EF \parallel AB$. Then $AE/ED = BF/FC$. Reason (R): Any line parallel to parallel sides of a trapezium divides the non-parallel sides proportionally.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
 (b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
 (c) Assertion (A) is true, but Reason (R) is false.
 (d) Assertion (A) is false, but Reason (R) is true.

Q53. CBSE 2024 · 1 mark Assertion (A): ABCD is a trapezium with $DC \parallel AB$. E and F are points on AD and BC respectively, such that $EF \parallel AB$. Then $AE/ED = BF/FC$. Reason (R): Any line parallel to parallel sides of a trapezium divides the non-parallel sides proportionally. Select the correct answer from the codes given: (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A). (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A). (C) Assertion (A) is true, but Reason (R) is false. (D) Assertion (A) is false, but Reason (R) is true.

- (a) (A) (b) (B) (c) (C) (d) (D)

7 Coordinate Geometry

Notes & MCQs →

MULTIPLE CHOICE AND ASSERTION-REASON (49)

Q1. CBSE 2026 · 1 mark The distance between the points $(-4, 2)$ and $(1, 0)$ is:

- (a) $\sqrt{13}$ units (b) 3 units (c) 9 units (d) $\sqrt{29}$ units

Q2. CBSE 2026 · 1 mark The distance between the points $(-5, 1)$ and $(2, 2)$ is:

- (a) $2\sqrt{5}$ units (b) 10 units (c) $5\sqrt{2}$ units (d) $3\sqrt{2}$ units

Q3. CBSE 2026 · 1 mark The distance between the points $(-1, 22)$ and $(2, 2)$ is:

- (a) 5 units (b) 11 units (c) 13 units (d) 7 units

Q4. CBSE 2026 · 1 mark The distance between the points $(-2, 5)$ and $(5, -2)$ is

- (a) $7\sqrt{2}$ (b) 14 (c) $2\sqrt{7}$ (d) 7

Q5. CBSE 2026 · 1 mark The distance between the points $(-4, 5)$ and $(-1, 2)$ is

- (a) 5 (b) $3\sqrt{2}$ (c) 6 (d) $2\sqrt{3}$

Q6. CBSE 2026 · 1 mark The fourth vertex D of a parallelogram ABCD whose three vertices are $A(-4, 1)$, $B(4, 5)$ and $C(6, 1)$ is:

- (a) $(-2, -3)$ (b) $(3, -2)$ (c) $(0, -1)$ (d) $(0, 1)$

Q7. CBSE 2026 · 1 mark The ratio in which the x-axis divides the line segment joining the points $A(-8, 4)$ and $B(-6, -2)$ is:

- (a) 5 : 1 (b) 3 : 1 (c) 2 : 1 (d) 1 : 2

Q8. CBSE 2026 · 1 mark The line segment joining the points $P(-4, -2)$ and $Q(10, 4)$ is divided by y-axis in the ratio

- (a) 2 : 5 (b) 1 : 2 (c) 2 : 1 (d) 5 : 2

Q9. CBSE 2026 · 1 mark For a point $(3, -5)$, the value of (abscissa - ordinate) is:

- (a) -8 (b) -2 (c) 2 (d) 8

Q10. CBSE 2026 · 1 mark The mid-point of a line segment divides the line segment in the ratio:

- (a) 1 : 2 (b) 2 : 1 (c) 1 : 1 (d) 3 : 2

Q11. CBSE 2026 · 1 mark The distance of a point $P(3, -7)$ from y-axis is :

- (a) 3 (b) 7 (c) -7 (d) 10

Q12. CBSE 2026 · 1 mark For a point $X(a, b)$ where $(b > a > 0)$, the value of its [distance from x-axis - distance from y-axis] is:

- (a) $a - b$ (b) $b - a$ (c) $a^2 - b^2$ (d) $b^2 - a^2$

Q13. CBSE 2026 · 1 mark The distance of the point $(2, 3)$ from the origin is:

- (a) 2 (b) 3 (c) 5 (d) $\sqrt{13}$

Q14. CBSE 2026 · 1 mark The mid-point of the line segment joining points $(1, 3)$ and $(1, -3)$ lies:

- (a) at the origin (b) in the second quadrant (c) on x-axis
(d) on y-axis

Q15. CBSE 2026 · 1 mark If point $(1, 2)$ is the mid-point of the line segment joining the points $(3, 5)$ and $(2a, b)$, then $(a, b) =$

- (a) $(1, 1)$ (b) $(-1, -1)$ (c) $(2, 2)$ (d) $(-1, 1)$

Q16. CBSE 2026 · 1 mark The distance of point $(3, 4)$ from y-axis is:

- (a) 3 (b) -3 (c) 4 (d) 5

Q17. CBSE 2026 · 1 mark If point $(a, 2b)$ is the mid-point of the line segment joining the points $(3, 5)$ and $(1, 1)$, then (a, b) is equal to:

- (a) $(1, 2)$ (b) $(2, 2)$ (c) $(2, 1)$ (d) $(1, 1)$

Q18. CBSE 2025 · 1 mark The mid-point of the line segment joining the points $P(-4, 5)$ and $Q(4, 6)$ lies on:

- (a) x-axis (b) y-axis (c) origin (d) neither x-axis nor y-axis

Q19. CBSE 2025 · 1 mark The end points of a diameter of circle are $(2, 4)$ and $(-3, -1)$. The length of its radius is:

- (a) $\sqrt{26}$ units (b) $\sqrt{(26/2)}$ units (c) $\sqrt{(25/2)}$ units
(d) $5\sqrt{2}$ units



Q20. CBSE 2025 · 1 mark The coordinates of the end points of a diameter of a circle are (5, -2) and (5, 2). The length of the radius of the circle is:

- (a) ± 2 (b) ± 4 (c) 4 (d) 2

Q21. CBSE 2025 · 1 mark The line represented by the equation $x - y = 0$ is:

- (a) parallel to x-axis (b) parallel to y-axis
(c) passing through the origin
(d) passing through the point (3, 2)

Q22. CBSE 2025 · 1 mark The equation of a line parallel to the x-axis and at a distance of 3 units below x-axis is:

- (a) $x = 3$ (b) $x = -3$ (c) $y = -3$ (d) $y = 3$

Q23. CBSE 2025 · 1 mark The perimeter of the triangle formed by the vertices (0, 0), (2, 0) and (0, 2) is:

- (a) 4 units (b) 6 units (c) $6\sqrt{2}$ units (d) $(4 + 2\sqrt{2})$ units

Q24. CBSE 2025 · 1 mark The equation of a line parallel to y-axis and at a distance of 5 units to the right of y-axis is:

- (a) $x = 5$ (b) $x = -5$ (c) $y = 5$ (d) $y = -5$

Q25. CBSE 2025 · 1 mark The line represented by $x/2 + y/3 = 1$ intersects x-axis and y-axis respectively at P and Q. The coordinates of the mid-point of line segment PQ are:

- (a) (2, 3) (b) (3, 2) (c) (2, 0) (d) (0, 3)

Q26. CBSE 2025 · 1 mark Two of the vertices of triangle PQR are P(1, 5) and Q(5, 2). The coordinates of a point which divides PQ in the ratio 2 : 1 are:

- (a) (3, -3) (b) (5, 5) (c) (3, 3) (d) (5, 1)

Q27. CBSE 2025 · 1 mark AOBC is a rectangle whose three vertices are A(0, 2), O(0, 0) and B(4, 0). The square of the length of its diagonal is equal to:

- (a) 36 (b) 20 (c) 16 (d) 4

Q28. CBSE 2025 · 1 mark If the mid-point of the line segment joining the points (a, 4) and (2, 2b) is (2, 6), then the value of (a + b) is given by:

- (a) 6 (b) 7 (c) 8 (d) 16

Q29. CBSE 2025 · 1 mark Two of the vertices of $\triangle PQR$ are P(1, 5) and Q(5, 2). The coordinates of a point which divides PQ in the ratio 2 : 1 are:

- (a) (3, -3) (b) (5, 5) (c) (3, 3) (d) (5, 1)

Q30. CBSE 2025 · 1 mark The line represented by $x/a + y/b = 1$, intersects x-axis and y-axis respectively at P and Q. The coordinates of the mid-point of line segment PQ are:

- (a) (2, 3) (b) (3, 2) (c) (2, 0) (d) (0, 3)

Q31. CBSE 2024 · 1 mark The perpendicular bisector of the line segment joining the points A(-1, 3) and B(2, 4) cuts the y-axis at:

- (a) (0, 5) (b) (0, -5) (c) (0, 4) (d) (0, -4)

Q32. CBSE 2024 · 1 mark Point P divides the line segment joining the points A(4, -5) and B(1, 2) in the ratio 5:2. Co-ordinates of point P are

- (a) $(5/2, -3/2)$ (b) $(11/7, 0)$ (c) $(13/7, 0)$ (d) $(0, 13/7)$

Q33. CBSE 2024 · 1 mark XOYZ is a rectangle with vertices X(-3, 0), O(0, 0), Y(0, 4) and Z(x, y). The length of its each diagonal is

- (a) 5 units (b) $\sqrt{5}$ units (c) $x^2 + y^2$ units (d) 4 units

Q34. CBSE 2024 · 1 mark The distance between the points $(a \cos \theta, -a \sin \theta)$ and $(a \sin \theta, a \cos \theta)$ is

- (a) a (b) a^2 (c) 0 (d) 2a

Q35. CBSE 2024 · 1 mark Assertion (A): The point which divides the line segment joining the points A (1, 2) and B(-1, 1) internally in the ratio 1 : 2 is $(-1/3, 5/3)$. Reason (R): The coordinates of the point which divides the line segment joining the points A (x_1, y_1) and B (x_2, y_2) in the ratio $m_1 : m_2$ are $((m_1x_2 + m_2x_1)/(m_1 + m_2), (m_1y_2 + m_2y_1)/(m_1 + m_2))$

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q36. CBSE 2024 · 1 mark Two lines are given to be parallel. The equation of one of these lines is $5x - 3y = 2$. The equation of the second line can be:

- (a) $-15x - 9y = 5$ (b) $15x + 9y = 5$ (c) $9x - 15y = 6$
(d) $-15x + 9y = 5$

Q37. CBSE 2024 · 1 mark The fourth vertex D of a parallelogram ABCD whose three vertices are A(-2, 3), B(6, 7) and C(8, 3) is:

- (a) (0, 1) (b) (0, -1) (c) (-1, 0) (d) (1, 0)

Q38. CBSE 2024 · 1 mark The distance of the point (3, 4) from the origin is

- (a) 25 (b) 5 (c) 7 (d) 1

Q39. CBSE 2024 · 1 mark Assertion (A): The point (0, 4) lies on y-axis. Reason (R): The x-coordinate of a point, lying on y-axis, is zero.

- (a) Both Assertion (A) and Reason (R) are correct and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are correct but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q40. CBSE 2023 · 1 mark The coordinates of the vertex A of a rectangle ABCD whose three vertices are given as B(0, 0), C(3, 0) and D(0, 4) are:

- (a) (4, 0) (b) (0, 3) (c) (3, 4) (d) (4, 3)

Q41. CBSE 2023 · 1 mark The pair of equations $x = a$ and $y = b$ graphically represents lines which are:

- (a) parallel (b) intersecting at (b, a) (c) coincident
(d) intersecting at (a, b)

Q42. CBSE 2023 · 1 mark The area of the triangle formed by the line $ax + by = 1$ with the coordinate axes is:

- (a) ab (b) $1/(2ab)$ (c) $1/(4ab)$ (d) 2ab

Q43. CBSE 2023 · 1 mark The ratio in which the x-axis divides the line segment joining the points (2, 3) and (6, 7) is:

- (a) 1:3 (b) 3:7 (c) 7:3 (d) 1:2



Q44. CBSE 2023 · 1 mark The distance of the point $(-1, 7)$ from x-axis is :

- (a) -1 (b) 7 (c) 6 (d) 50

Q45. CBSE 2023 · 1 mark The distance of the point $(-6, 8)$ from origin is :

- (a) 6 (b) -6 (c) 8 (d) 10

Q46. CBSE 2023 · 1 mark The points $(-4, 0)$, $(4, 0)$ and $(0, 3)$ are the vertices of a :

- (a) right triangle (b) isosceles triangle
(c) equilateral triangle (d) scalene triangle

Q47. CBSE 2023 · 1 mark The distance between the points $P(5, 3\sqrt{11})$ and $Q(5, 3\sqrt{2})$ is :

- (a) 6 units (b) 4 units (c) 2 units (d) 3 units

Q48. CBSE 2023 · 1 mark Assertion (A): If the points $A(4, 3)$ and $B(x, 5)$ lie on a circle with centre $O(2, 3)$, then the value of x is 2 . Reason (R): Centre of a circle is the mid-point of each chord of the circle.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q49. CBSE 2023 · 1 mark If end points of a diameter of a circle are $(5, 4)$ and $(1, 0)$, then the radius of the circle is:

- (a) $\sqrt{13}/2$ units (b) $\sqrt{13}$ units (c) $2\sqrt{4}$ units (d) $2\sqrt{2}$ units

VERY SHORT ANSWER (17)

Q50. CBSE 2026 · 2 marks A $(-2, 3)$ and B $(4, 1)$ are end points of the diameter of a semi-circle. The semi-circle intersects y-axis at point P. Find the co-ordinates of the point P.

Q51. CBSE 2026 · 2 marks The vertices of a $\triangle ABC$ are $A(-1, 3)$, $B(2, -3)$ and $C(4, 5)$. Find the coordinates of a point P on median AD such that $AP : PD = 2 : 3$.

Q52. CBSE 2026 · 2 marks If $A(a, 0)$, $B(1, 1)$ and $C(0, b)$ form a triangle, right angled at B when joined, then establish a relation between a and b .

Q53. CBSE 2026 · 2 marks Vertices of a right triangle ABC with $\angle B = 90^\circ$ are $A(3, 4)$, $B(1, 1)$ and $C(-8, 7)$. Find the value of $\tan A$.

Q54. CBSE 2025 · 2 marks The coordinates of the centre of a circle are $(2a, a - 7)$. Find the value(s) of a if the circle passes through the point $(11, -9)$ and has diameter 10 units.

Q55. CBSE 2025 · 2 marks The coordinates of the centre of a circle are $(2a, a - 7)$. Find the value(s) of a if the circle passes through the points $(-9, 9)$ and has diameter 10 units.

Q56. CBSE 2025 · 2 marks Find the length of the median through the vertex B of $\triangle ABC$ with vertices $A(9, -2)$, $B(-3, 7)$ and $C(1, 10)$.

Q57. CBSE 2024 · 2 marks Find the type of triangle ABC formed whose vertices are $A(1, 0)$, $B(-5, 0)$ and $C(-2, 5)$.

Q58. CBSE 2024 · 2 marks In what ratio is the line segment joining the points $(3, -5)$ and $(-1, 6)$ divided by the line $y = x$?

Q59. CBSE 2024 · 2 marks The vertices of a $\triangle ABC$ are $A(-2, 4)$, $B(4, 3)$ and $C(1, -6)$. Find length of the median BD.

Q60. CBSE 2024 · 2 marks Find a relation between x and y such that the point $P(x, y)$ is equidistant from the points $A(7, 1)$ and $B(3, 5)$.

Q61. CBSE 2024 · 2 marks (a) Find the ratio in which the point $P(-4, 6)$ divides the line segment joining the points $A(-6, 10)$ and $B(3, -8)$.

Q62. CBSE 2023 · 2 marks Show that the points $(-2, 3)$, $(8, 3)$ and $(6, 7)$ are the vertices of a right-angled triangle.

Q63. CBSE 2023 · 2 marks The line segment joining the points $A(4, -5)$ and $B(4, 5)$ is divided by the point P such that $AP : AB = 2 : 5$. Find the coordinates of P.

Q64. CBSE 2023 · 2 marks Find the ratio in which y-axis divides the line segment joining the points $(5, -6)$ and $(-1, -4)$.

Q65. CBSE 2023 · 2 marks Find the ratio in which line $y = x$ divides the line segment joining the points $(6, 3)$ and $(1, 6)$.

Q66. CBSE 2023 · 2 marks (a) The line segment joining the points $A(4, -5)$ and $B(4, 5)$ is divided by the point P such that $AP : AB = 2 : 5$. Find the coordinates of P. OR (b) Point $P(x, y)$ is equidistant from points $A(5, 1)$ and $B(1, 5)$. Prove that $x = y$.

SHORT ANSWER (17)

Q67. CBSE 2026 · 3 marks The vertices of a rhombus ABCD are $A(-3, -4)$, $B(5, -3)$, $C(1, 4)$ and $D(-7, 3)$. Find the length of both the diagonals. Hence, find area of the rhombus ABCD.

Q68. CBSE 2026 · 3 marks Points $P(6, 0)$, $Q(2, 8)$ and $R(-2, 4)$ are vertices of $\triangle PQR$. It is given that $MN \parallel QR$ such that $PM/MQ = 1/3$. Using distance formula and ratio formula, show that $MN/QR = 1/4$.

Q69. CBSE 2026 · 3 marks Determine the ratio in which the line $2x + y = 6$ divides the line segment joining the points $(1, 3)$ and $(2, 5)$.

Q70. CBSE 2026 · 3 marks Find the coordinates of the points of trisection of the line segment joining the points $P(5, -4)$ and $Q(-4, 2)$.

Q71. CBSE 2026 · 3 marks Find a relation between x and y such that the point $P(x, y)$ is equidistant from the points $A(5, 3)$ and $B(1, 7)$.

Q72. CBSE 2026 · 3 marks A circle centered at $(2, 1)$ passes through the points $A(5, 6)$ and $B(-3, K)$. Find the value(s) of K . Hence find length of chord AB.

Q73. CBSE 2025 · 3 marks Find the ratio in which the y-axis divides the line segment joining the points $(5, -6)$ and $(-1, -4)$. Also find the point of intersection.

Q74. CBSE 2025 · 3 marks If the mid-point of the line segment joining the points $A(3, 4)$ and $B(k, 6)$ is $P(x, y)$ and $x + y - 10 = 0$, then find the value of k .

Q75. CBSE 2025 · 3 marks If (a, b) is the mid-point of the line segment joining the points $A(10, -6)$ and $B(k, 4)$ and $a - 2b = 18$, then find the value of k .

Q76. CBSE 2025 · 3 marks If the mid-point of the line segment joining the points $A(3, 4)$ and $B(k, 6)$ is $P(x, y)$ and $x + y - 10 = 0$, find the value of k .



Q77. CBSE 2025 · 3 marks (a) If the mid-point of the line segment joining the points A(3, 4) and B(k, 6) is P(x, y) and $x + y - 10 = 0$, find the value of k. OR (b) Find the coordinates of the points which divide the line segment joining A(-2, 2) and B(2, 8) into four equal parts.

Q78. CBSE 2024 · 3 marks Find the ratio in which the line segment joining the points (5, 3) and (-1, 6) is divided by Y-axis.

Q79. CBSE 2024 · 3 marks In what ratio does the X-axis divide the line segment joining the points (2, -3) and (5, 6)? Also, find the coordinates of the point of intersection.

Q80. CBSE 2023 · 3 marks If Q(0, 1) is equidistant from P(5, -3) and R(x, 6), find the values of x.

Q81. CBSE 2022 · 3 marks Draw a line segment AB = 7 cm. Divide it in the ratio 3 : 2.

Q82. CBSE 2022 · 3 marks Draw a line segment AB of length 8 cm and locate a point P on AB such that AP : PB = 1 : 5.

Q83. CBSE 2022 · 3 marks Draw a line segment PQ = 7.5 cm. Divide it in the ratio 3 : 1.

LONG ANSWER (1)

Q84. CBSE 2024 · 5 marks The vertices of a quadrilateral ABCD are A(6, -2), B(9, 2), C(5, -1) and D(2, -5). Prove that ABCD is a rhombus, and not a square.

CASE-BASED (10)

CASE STUDY · CBSE 2026

In the school garden, Arun (A), Babu (B), Chandra (C) and Daya (D) planted flower plants of Sunflower, Rose, Champa and Jasmine respectively at point A(2, 8), B(7, 8), C(9, 3) and D(2, 3) respectively.

Q85. CBSE 2026 · 4 marks Find the distances AB and AD.

CASE STUDY · CBSE 2026

In a society, there is a circular park having two gates. The gates are placed at points A(10, 20) and B(50, 50). Two fountains are installed at points P and Q on AB such that AP = PQ = QB.

Q86. CBSE 2026 · 1 mark Find the coordinates of the centre C.

CASE STUDY · CBSE 2026

A field is in the form of a rectangle. The coordinates of the rectangular field ABCD are A(10, 10), B(40, 10), C(40, 50) and D(x, y). Anil and Anita, two friends decided to have a race. Anita started from point A and moved to point E along the diagonal AC, where E is the point of intersection of both the diagonals of ABCD. From point E, she moved to point B along the other diagonal DB and then moved back to point A along BA. While Anil started from point C and ran to point A via D along the boundary of the field.

Q87. CBSE 2026 · 1 mark (i) Find the coordinates of point E.

CASE STUDY · CBSE 2026

A semicircular park has saplings along the boundary of the park. There is a borewell at the centre O of the park along the diameter AB.

Q88. CBSE 2026 · 1 mark Find the coordinates of point O.

CASE STUDY · CBSE 2026

A semicircular park has a borewell at the centre O of the park along the diameter AB.

Q89. CBSE 2026 · 1 mark (i) Find the coordinates of point O.

CASE STUDY · CBSE 2025

A garden designer is planning a rectangular lawn that is to be surrounded by a uniform walkway. The total area of the lawn and the walkway is 360 square metres. The width of the walkway is same on all sides. The dimensions of the lawn itself are 12 metres by 10 metres.

Q90. CBSE 2025 · 1 mark Find the perimeter of the lawn.

Q91. CBSE 2024 · 1 mark Assertion (A): Mid-point of a line segment divides the line segment in the ratio 1 : 1. Reason (R): The ratio in which the point (-3, k) divides the line segment joining the points (-5, 4) and (-2, 3) is 1 : 2.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
- (b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
- (c) Assertion (A) is true, but Reason (R) is false.
- (d) Assertion (A) is false, but Reason (R) is true.

CASE STUDY · CBSE 2024

The top of a table is hexagonal in shape.

Q92. CBSE 2024 · 4 marks (i) Write the coordinates of A and B.

CASE STUDY · CBSE 2023

Jagdish has a field which is in the shape of a right angled triangle AQC. He wants to leave a space in the form of a square PQRS inside the field for growing wheat and the remaining for growing vegetables. In the field, there is a pole marked as O.

Q93. CBSE 2023 · 1 mark Taking O as origin, coordinates of P are (-200, 0) and of Q are (200, 0). PQRS being a square, what are the coordinates of R and S ?



Q94. CBSE 2023 · 1 mark Jagdish has a field which is in the shape of a right angled triangle AQC. He wants to leave a space in the form of a square PQRS inside the field for growing wheat and the remaining for growing vegetables. In the field, there is a pole marked as O. Taking O as origin, coordinates of P are $(-200, 0)$ and of Q are $(200, 0)$. PQRS being a square, what are the coordinates of R and S?

8 Introduction to Trigonometry

Notes & MCQs →

MULTIPLE CHOICE AND ASSERTION-REASON (63)

Q1. CBSE 2026 · 1 mark The value of $\sin 90^\circ \cos 90^\circ - \sin^2 60^\circ$ is:

- (a) $1/4$ (b) $3/4$ (c) $-3/4$ (d) $5/4$

Q2. CBSE 2026 · 1 mark If $\sin \theta = 1/7$, then $\tan \theta$ is:

- (a) $1/(4\sqrt{3})$ (b) $1/(2\sqrt{3})$ (c) $(4\sqrt{3})/7$ (d) $6/7$

Q3. CBSE 2026 · 1 mark The value of $\tan 30^\circ \tan 60^\circ - \sin 90^\circ \cos 90^\circ$ is:

- (a) 1 (b) 0 (c) 2 (d) not defined

Q4. CBSE 2026 · 1 mark The value of $2 \tan 45^\circ \sin^2 60^\circ - \cos 90^\circ$ is:

- (a) $-1/4$ (b) $3/2$ (c) $3/4$ (d) $1/4$

Q5. CBSE 2026 · 1 mark If value of $\cot \theta$ is 5, then $\sin \theta$ equals

- (a) $1/\sqrt{6}$ (b) $\sqrt{6}$ (c) $5/\sqrt{6}$ (d) $1/2$

Q6. CBSE 2026 · 1 mark Assertion (A): For an acute angle θ , $\cos \theta$ is always less than 1. Reason (R): In a right-angled triangle, hypotenuse is the longest side and $\cos \theta = \text{Base}/\text{Hypotenuse}$.

- (a) Both, Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A)
 (b) Both, Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A)
 (c) Assertion (A) is true, but Reason (R) is false
 (d) Assertion (A) is false, but Reason (R) is true

Q7. CBSE 2026 · 1 mark If $\sin \theta = 1/11$, then $\cot \theta$ equals

- (a) $11/\sqrt{10}$ (b) $\sqrt{10}/11$ (c) $\sqrt{10}$ (d) 11

Q8. CBSE 2026 · 1 mark The length of a pendulum is 70 cm and it describes an arc of length 88 cm when swings. The angle subtended by the arc at the centre is

- (a) 36° (b) 70° (c) 72° (d) 80°

Q9. CBSE 2026 · 1 mark If $x \tan 45^\circ \sin 30^\circ = \cos 30^\circ \cot 60^\circ$, then x is equal to

- (a) 3 (b) $1/3$ (c) 1 (d) $1/2$

Q10. CBSE 2026 · 1 mark $\sin 2\theta = 2\sin\theta$ is true, when θ is equal to

- (a) 90° (b) 60° (c) 45° (d) 0°

Q11. CBSE 2026 · 1 mark If $\cos A = 3/5$, then the value of $\tan A$ is:

- (a) $4/5$ (b) $5/4$ (c) $3/4$ (d) $4/3$

Q12. CBSE 2026 · 1 mark If $\sin \theta = \sqrt{3}/2$, then the value of $2\sqrt{3} \cos^2 \theta$ is:

- (a) 3 (b) $2\sqrt{3}$ (c) $\sqrt{3}/2$ (d) $\sqrt{3}$

Q13. CBSE 2026 · 1 mark For an acute angle θ , if $\sin \theta = 1/9$, then value of $(9 \operatorname{cosec} \theta + 1)/(9 \operatorname{cosec} \theta - 1)$ is

- (a) 0 (b) $80/81$ (c) 1 (d) $82/80$

Q14. CBSE 2026 · 1 mark Simplest form of $\sec A/\sqrt{\sec^2 A - 1}$ is

- (a) $\sin A$ (b) $\tan A$ (c) $\operatorname{cosec} A$ (d) $\cos A$

Q15. CBSE 2026 · 1 mark Which of the following statements is false?

- (a) $\tan 45^\circ = \cot 45^\circ$ (b) $\sin 90^\circ = \tan 45^\circ$
 (c) $\sin 30^\circ = \cos 30^\circ$ (d) $\sin 45^\circ = \cos 45^\circ$

Q16. CBSE 2026 · 1 mark The value of $\sin^2 45^\circ + \cos^2 45^\circ$ is:

- (a) more than 1 (b) 1 (c) 0 (d) -1

Q17. CBSE 2026 · 1 mark The value of $\sin^2 30^\circ + \cos^2 30^\circ$ is:

- (a) more than 1 (b) 1 (c) 0 (d) -1

Q18. CBSE 2026 · 1 mark The value of $\sin 30^\circ + \cos 60^\circ$ is:

- (a) $3/2$ (b) $1/2$ (c) 1 (d) $\sqrt{3}/2$

Q19. CBSE 2026 · 1 mark The value of $(\sin^2 A + \cos^2 A) + (\sec^2 A - \tan^2 A) - (\cot^2 A - \operatorname{cosec}^2 A)$ is:

- (a) 1 (b) -1 (c) 3 (d) 2

Q20. CBSE 2026 · 1 mark If angle of elevation changes from 30° to 60° , the length of shadow will:

- (a) become shorter (b) become longer (c) remain same
 (d) be doubled

Q21. CBSE 2026 · 1 mark $(\sin \theta + \cos \theta)^2 + (\sin \theta - \cos \theta)^2 =$

- (a) 1 (b) 2 (c) $2 + 2 \sin \theta \cos \theta$ (d) $2 + 4 \sin \theta \cos \theta$

Q22. CBSE 2026 · 1 mark The value of $\sin^2 30^\circ + \cos^2 60^\circ$ is:

- (a) 3 (b) $1/2$ (c) 1 (d) $3/4$

Q23. CBSE 2026 · 1 mark $(\sec \theta - \cos \theta)^2 + \sin^2 \theta - \tan^2 \theta = ?$

- (a) 0 (b) 1 (c) 2 (d) 4

Q24. CBSE 2026 · 1 mark Assertion (A): For $\sin \theta = 1$, $\cos \theta$ must be 0. Reason (R): $\sin^2 \theta - \cos^2 \theta = 1$. Select the correct answer from the codes: (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A). (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A). (C) Assertion (A) is true, but Reason (R) is false. (D) Assertion (A) is false, but Reason (R) is true.

- (a) (A) (b) (B) (c) (C) (d) (D)



Q25. CBSE 2026 · 1 mark Assertion (A): For an acute angle θ , $\cot \theta = 1$ implies $\operatorname{cosec} \theta = \sqrt{2}$. Reason (R): $\operatorname{cosec}^2 \theta - \cot^2 \theta = 1$. Select the correct answer from the codes given.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
 (b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
 (c) Assertion (A) is true, but Reason (R) is false.
 (d) Assertion (A) is false, but Reason (R) is true.

Q26. CBSE 2026 · 1 mark The value of θ for which $\sin 2\theta = \tan 45^\circ$ is:

- (a) 22.5° (b) 30° (c) 45° (d) 90°

Q27. CBSE 2026 · 1 mark Assertion (A): For an angle θ , $\sec \theta = 1$ and $\tan \theta = 0$. Reason (R): $\sec 2\theta + \tan 2\theta = 1$.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
 (b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
 (c) Assertion (A) is true, but Reason (R) is false.
 (d) Assertion (A) is false, but Reason (R) is true.

Q28. CBSE 2025 · 1 mark If θ is an acute angle and $7 + 4 \sin \theta = 9$, then the value of θ is:

- (a) 90° (b) 30° (c) 45° (d) 60°

Q29. CBSE 2025 · 1 mark The value of $\tan^2 45^\circ - \cos^2 60^\circ$ is:

- (a) 1 (b) 0 (c) -1 (d) 2

Q30. CBSE 2025 · 1 mark If $\alpha + \beta = 90^\circ$ and $\tan \alpha = 2$, then $\cos^2 \beta + \sin^2 \alpha$ is equal to:

- (a) 0 (b) $1/2$ (c) 1 (d) 2

Q31. CBSE 2025 · 1 mark The value of $\tan^2 45^\circ - \cot^2 60^\circ$ is:

- (a) 1 (b) 0 (c) -1 (d) 2

Q32. CBSE 2025 · 1 mark The value of $(\tan A \operatorname{cosec} A)^2 - (\sin A \sec A)^2$ is:

- (a) 0 (b) 1 (c) -1 (d) 2

Q33. CBSE 2025 · 1 mark If $7 \cos^2 \theta + 3 \sin^2 \theta = 4$, then the value of θ is:

- (a) 30° (b) 45° (c) 60° (d) 90°

Q34. CBSE 2025 · 1 mark If $\sin 30^\circ \tan 45^\circ = k/2$, then the value of k is:

- (a) 4 (b) 3 (c) 2 (d) 1

Q35. CBSE 2025 · 1 mark If $\sin 30^\circ / \tan 45^\circ = k$, then the value of k is:

- (a) 4 (b) 3 (c) 2 (d) 1

Q36. CBSE 2025 · 1 mark If $\tan 3\theta = 1$, then θ equals:

- (a) 60° (b) 30° (c) 20° (d) 10°

Q37. CBSE 2025 · 1 mark $(\cot \theta + \tan \theta)$ equals:

- (a) $\operatorname{cosec} \theta \sec \theta$ (b) $\sin \theta \sec \theta$ (c) $\cos \theta \tan \theta$
 (d) $\sin \theta \cos \theta$

Q38. CBSE 2025 · 1 mark If $\sin 4\theta = 1$, then θ equals:

- (a) 60° (b) 20° (c) 15° (d) 5°

Q39. CBSE 2025 · 1 mark If $\tan 3\theta = \sqrt{3}$, then θ equals:

- (a) 60° (b) 30° (c) 20° (d) 10°

Q40. CBSE 2025 · 1 mark If $\sin^2 \theta - 3 \sin \theta = 0$, then the values of θ are:

- (a) $\pm 6^\circ$ (b) $\pm 4^\circ$ (c) $\pm 12^\circ$ (d) $\pm 3^\circ$

Q41. CBSE 2024 · 1 mark If $\tan A = 3 \cot A$, then the measure of the angle A is:

- (a) 15° (b) 30° (c) 45° (d) 60°

Q42. CBSE 2024 · 1 mark $(\sec \theta + \tan \theta)(1 - \sin \theta)$ is equal to:

- (a) $\sec \theta$ (b) $\sin \theta$ (c) $\operatorname{cosec} \theta$ (d) $\cos \theta$

Q43. CBSE 2024 · 1 mark If $\sin \theta = \cos \theta$, ($0^\circ < \theta < 90^\circ$), then value of $(\sec \theta \cdot \sin \theta)$ is:

- (a) $1/2$ (b) 2 (c) 1 (d) 0

Q44. CBSE 2024 · 1 mark Assertion (A): If $\sin A = 1/3$ ($0^\circ < A < 90^\circ$), then the value of $\cos A$ is $2\sqrt{2}/3$. Reason (R): For every angle θ , $\sin^2 \theta + \cos^2 \theta = 1$.

- (a) Both Assertion (A) and Reason (R) are true. Reason (R) is the correct explanation of Assertion (A).
 (b) Both Assertion (A) and Reason (R) are true. Reason (R) does not give correct explanation of (A).
 (c) Assertion (A) is true but Reason (R) is not true.
 (d) Assertion (A) is not true but Reason (R) is true.

Q45. CBSE 2024 · 1 mark Assertion (A): If $\sin A = 1/3$ ($0^\circ < A < 90^\circ$), then the value of $\cos A$ is $2\sqrt{2}/3$. Reason (R): For every angle θ , $\sin^2 \theta + \cos^2 \theta = 1$. Select the correct option.

- (a) Both Assertion (A) and Reason (R) are true. Reason (R) is the correct explanation of Assertion (A).
 (b) Both Assertion (A) and Reason (R) are true. Reason (R) does not give correct explanation of (A).
 (c) Assertion (A) is true but Reason (R) is not true.
 (d) Assertion (A) is not true but Reason (R) is true.

Q46. CBSE 2024 · 1 mark If $\cos \theta = \sqrt{3}/2$ and $\sin \phi = 1/2$, then $\tan(\theta + \phi)$ is:

- (a) $\sqrt{3}$ (b) $1/\sqrt{3}$ (c) 1 (d) not defined

Q47. CBSE 2024 · 1 mark If $\sin \alpha = \sqrt{3}/2$, $\cos \beta = \sqrt{3}/2$, then $\tan \alpha \times \tan \beta$ is:

- (a) $\sqrt{3}$ (b) $1/\sqrt{3}$ (c) 1 (d) 0

Q48. CBSE 2024 · 1 mark If $\sin \theta = 1$, then the value of $2^{1/(2)} \sin(\theta/2)$ is:

- (a) $2^{1/(2)/2}$ (b) $1/2$ (c) $\sqrt{1/2}$ (d) 0

Q49. CBSE 2024 · 1 mark At some time of the day, the length of the shadow of a tower is equal to its height. Then, the Sun's altitude at that time is:

- (a) 30° (b) 45° (c) 60° (d) 90°

Q50. CBSE 2024 · 1 mark The value of θ for which $2 \sin^2 \theta = 1/2$; $0^\circ \leq \theta \leq 90^\circ$ is:

- (a) 30° (b) 60° (c) 45° (d) 90°

Q51. CBSE 2024 · 1 mark If $3x = 2 \sin A$, $3y = 2 \cos A$, then the value of $x^2 + y^2$ is:

- (a) 36 (b) 9 (c) 6 (d) 18



Q52. CBSE 2024 · 1 mark If $4 \sec \theta - 5 = 0$, then the value of $\cot \theta$ is:

- (a) $4/3$ (b) $5/4$ (c) $3/5$ (d) $3/4$

Q53. CBSE 2024 · 1 mark If $x = a \cos \theta$ and $y = b \sin \theta$, then the value of $b^2x^2 + a^2y^2$ is:

- (a) a^2b^2 (b) ab (c) a^4b^4 (d) $a^2 + b^2$

Q54. CBSE 2024 · 1 mark If $5 \tan \theta - 12 = 0$, then the value of $\sin \theta$ is:

- (a) $12/5$ (b) $13/12$ (c) $13/5$ (d) $5/12$

Q55. CBSE 2024 · 1 mark $\tan^2 A + \cot^2 A + 1$ is equal to

- (a) $\sec^2 A$ (b) -1 (c) $\cot^2 A$ (d) $\tan^2 A$

Q56. CBSE 2024 · 1 mark If $\sin^2 \theta = 3/4$, then θ is

- (a) 30° (b) 45° (c) 60° (d) 90°

Q57. CBSE 2023 · 1 mark Which of the following is true for all values of θ ($0^\circ \leq \theta \leq 90^\circ$)?

- (a) $\cos^2 \theta - \sin^2 \theta = 1$ (b) $\operatorname{cosec}^2 \theta - \sec^2 \theta = 1$
(c) $\sec^2 \theta - \tan^2 \theta = 1$ (d) $\cot^2 \theta - \tan^2 \theta = 1$

Q58. CBSE 2023 · 1 mark $(\sec^2 \theta - 1)(\operatorname{cosec}^2 \theta - 1)$ is equal to :

- (a) -1 (b) 1 (c) 0 (d) 2

Q59. CBSE 2023 · 1 mark If $\tan \theta = 12/5$, then the value of $(\cos \theta - \sin \theta)/(\cos \theta + \sin \theta)$ is :

- (a) $7/17$ (b) $-7/17$ (c) $13/17$ (d) $1/3$

Q60. CBSE 2023 · 1 mark $\tan 30^\circ \times \tan 130^\circ - \tan 22^\circ$ is equal to :

- (a) $\sin 60^\circ$ (b) $\cos 60^\circ$ (c) $\tan 60^\circ$ (d) $\sin 30^\circ$

Q61. CBSE 2023 · 1 mark $\tan 30^\circ \times \tan 13^\circ / \tan 122^\circ$ is equal to:

- (a) $\sin 60^\circ$ (b) $\cos 60^\circ$ (c) $\tan 60^\circ$ (d) $\cos 30^\circ$

Q62. CBSE 2023 · 1 mark If $\sec \theta - \tan \theta = 1/3$, then the value of $(\sec \theta + \tan \theta)$ is :

- (a) $3/4$ (b) $3/2$ (c) $3/1$ (d) 3

Q63. CBSE 2023 · 1 mark $\tan 30^\circ \times \tan 13^\circ \times \tan 22^\circ \times \tan 60^\circ$ is equal to :

- (a) $\sin 60^\circ$ (b) $\cos 60^\circ$ (c) $\tan 60^\circ$ (d) $\sin 30^\circ$

VERY SHORT ANSWER (34)

Q64. CBSE 2026 · 2 marks If $\sin(A - B) = 1/2$ and $\tan(A + B) = \sqrt{3}$, $0^\circ \leq A + B < 90^\circ$, $A > B$ then find the values of A and B.

Q65. CBSE 2026 · 2 marks If $\sin 2A = \sqrt{3}/2$ and $2 \tan B + 1 = 3$, then find the value of $(A + B)$.

Q66. CBSE 2026 · 2 marks If $\sin A = 1/2$ and $\tan B = \sqrt{3}$, then verify that $\cos(A + B) = \cos A \cos B - \sin A \sin B$.

Q67. CBSE 2026 · 2 marks If $\sec A = 2$ and $\tan B = 3$, then find the value of $2 \sin A \cos B$.

Q68. CBSE 2026 · 2 marks (a) Evaluate: $\sin 30^\circ/5 - \tan 345^\circ \sec^2 30^\circ + \sin 22/7\pi$ (b) For $A = 60^\circ$ and $B = 30^\circ$, verify that $\tan(A - B) = (\tan A - \tan B)/(1 + \tan A \tan B)$.

Q69. CBSE 2026 · 2 marks If $7 \sin^2 A + 3 \cos^2 A = 4$, then find the value of $\tan A$.

Q70. CBSE 2026 · 2 marks (a) Find the values of A and B ($0^\circ \leq A < 90^\circ$, $0^\circ \leq B < 90^\circ$), if $\tan(A + B) = 1$ and $\tan(A - B) = 1/\sqrt{3}$. OR (b) Prove that $\tan 45^\circ = 1$ geometrically.

Q71. CBSE 2026 · 2 marks Find the values of A and B ($0^\circ \leq A < 90^\circ$, $0^\circ \leq B < 90^\circ$), if $\tan(A + B) = 1$ and $\tan(A - B) = 1/\sqrt{3}$.

Q72. CBSE 2026 · 2 marks Evaluate: $(\sin 30^\circ + \cos 30^\circ)^2 + (\sin 60^\circ - \cos 60^\circ)^2$

Q73. CBSE 2026 · 2 marks Evaluate: $2\sin^2 45^\circ - \cos^2 45^\circ$

Q74. CBSE 2026 · 2 marks If $\sin 3A = 1$, then find the value of $\cos 2A - \tan^2 45^\circ$.

Q75. CBSE 2025 · 2 marks (a) If $x \cos 60^\circ + y \cos 0^\circ + \sin 30^\circ - \cot 45^\circ = 5$, then find the value of $x + 2y$. OR (b) Evaluate: $\sin^2 30^\circ + \cos^2 45^\circ + \tan^2 60^\circ$

Q76. CBSE 2025 · 2 marks If $x \cos 60^\circ + y \cos 0^\circ + \sin 30^\circ - \cot 45^\circ = 5$, then find the value of $x + 2y$.

Q77. CBSE 2025 · 2 marks If $\tan A = 3/4$, where A is an acute angle, then find the value of $\sin A + \cos A$.

Q78. CBSE 2025 · 2 marks If $\tan A = 3/4$; where A is an acute angle, then find the value of $\sec A$.

Q79. CBSE 2025 · 2 marks If $\tan A = \sqrt{3}/4$; where A is an acute angle, then find the value of $\operatorname{cosec} A$.

Q80. CBSE 2025 · 2 marks If $4k = \tan^2 60^\circ - 2 \operatorname{cosec}^2 30^\circ - 2 \tan^2 30^\circ$, then find the value of k.

Q81. CBSE 2025 · 2 marks If $\tan A + \cot A = 6$, then find the value of $\tan^2 A + \cot^2 A - 4$.

Q82. CBSE 2024 · 2 marks If $\tan \theta + \sec \theta = m$, then prove that $\sec \theta = (m^2 + 1)/(2m)$.

Q83. CBSE 2024 · 2 marks Evaluate: $2 \sin^2 30^\circ \sec 60^\circ + \tan^2 60^\circ$.

Q84. CBSE 2024 · 2 marks Evaluate: $(\cos 45^\circ + \sin 60^\circ)/(\sec 30^\circ + \operatorname{cosec} 30^\circ)$.

Q85. CBSE 2024 · 2 marks Evaluate: $(\sec^2 45^\circ - \tan^2 45^\circ)/\sin^2 45^\circ$

Q86. CBSE 2024 · 2 marks Evaluate: $5 \tan 60^\circ (\sin^2 60^\circ + \cos^2 60^\circ) / \tan 30^\circ$

Q87. CBSE 2024 · 2 marks (a) Evaluate: $(5 \cos^2 60^\circ + 4 \sec^2 30^\circ - \tan^2 45^\circ) / (\sin^2 60^\circ + \sin^2 30^\circ)$ OR (b) If $\sin(A - B) = 1/2$, $\cos(A + B) = 1/2$; $0 < A + B \leq 90^\circ$, $A > B$; find $\angle A$ and $\angle B$.

Q88. CBSE 2024 · 2 marks (a) Evaluate: $(5 \cdot 2^2 \cos^2 60^\circ + 4 \sec^2 30^\circ - \tan^2 45^\circ) / (\sin^2 60^\circ + \sin^2 30^\circ)$

Q89. CBSE 2024 · 2 marks (a) Evaluate: $5 \cos^2 60^\circ + 4 \sec^2 30^\circ - \tan^2 45^\circ / \sin^2 30^\circ + \sin^2 60^\circ$

Q90. CBSE 2024 · 2 marks Evaluate: $(2 \tan 30^\circ \cdot \sec 60^\circ \cdot \tan 45^\circ)^2 / (1 - \sin 60^\circ)$

Q91. CBSE 2024 · 2 marks Evaluate: $(2 \tan 30^\circ \times \sec 60^\circ \times \tan 45^\circ)/(1 - \sin 60^\circ)^2$

Q92. CBSE 2023 · 2 marks If $4 \cot^2 45^\circ - \sec^2 60^\circ + \sin^2 60^\circ + p = 4/3$, then find the value of p.



Q93. CBSE 2023 · 2 marks Evaluate $(5\cos^2 60^\circ + 4\sec^2 30^\circ - \tan^2 45^\circ) / (\sin^2 30^\circ + \cos^2 30^\circ)$

Q94. CBSE 2023 · 2 marks (A) Evaluate: $5 + \cot^2 30^\circ + \sin^2 60^\circ - \cot^2 45^\circ + 2\sin^2 90^\circ / 2$ OR (B) If θ is an acute angle and $\sin \theta = \cos \theta$, find the value of $\tan^2 \theta + \cot^2 \theta - 2$.

Q95. CBSE 2023 · 2 marks Evaluate $2\sec^2 \theta + 3\operatorname{cosec}^2 \theta - 2\sin \theta \cos \theta$ if $\theta = 45^\circ$.

Q96. CBSE 2023 · 2 marks If $a \cos \theta + b \sin \theta = m$ and $a \sin \theta - b \cos \theta = n$, then prove that $a^2 + b^2 = m^2 + n^2$.

Q97. CBSE 2023 · 2 marks (a) If $a \cos \theta + b \sin \theta = m$ and $a \sin \theta - b \cos \theta = n$, then prove that $a^2 + b^2 = m^2 + n^2$. OR (b) Prove that: $(1 - \sec A)/(\tan A) - (\tan A)/(1 - \sec A) = 2 \operatorname{cosec} A$

SHORT ANSWER (43)

Q98. CBSE 2026 · 3 marks Prove that $(\cot A - \cos A)/(\cot A + \cos A) = (\sec A - \tan A)/(\sec A + \tan A)$

Q99. CBSE 2026 · 3 marks Prove that $(\sec \theta + \tan \theta)^2 - 1 / (\sec \theta + \tan \theta)^2 + 1 = \sin \theta$.

Q100. CBSE 2026 · 3 marks Prove that $(1 - \sin A)/(1 + \sin A) = (\sec A - \tan A)^2$.

Q101. CBSE 2026 · 3 marks Prove that: $\tan^2 \theta + \cot^2 \theta + 2 = \sec^2 \theta \operatorname{cosec}^2 \theta$.

Q102. CBSE 2026 · 3 marks Prove that: $(1 - \cos A)/(1 + \cos A) = (\operatorname{cosec} A - \cot A)^2$.

Q103. CBSE 2026 · 3 marks If $\cos A + \sin A = \sqrt{2} \cos A$, prove that $\cos A - \sin A = \sqrt{2} \sin A$.

Q104. CBSE 2026 · 3 marks If $\cos \theta + \sin \theta = \sqrt{2} \cos \theta$, then prove that $\cos \theta - \sin \theta = \sqrt{2} \sin \theta$.

Q105. CBSE 2026 · 3 marks Evaluate: $(\sin^3 60^\circ - \tan 30^\circ)/\cos^2 45^\circ$

Q106. CBSE 2026 · 3 marks Prove that: $\tan \theta/(1 - \cot \theta) + \cot \theta/(1 - \tan \theta) = 1 + \tan \theta + \cot \theta$

Q107. CBSE 2026 · 3 marks Prove the following trigonometric identity: $(1 - \cos A)/\sin A = \sin A/(1 + \cos A) = \sec A - \tan A$

Q108. CBSE 2026 · 3 marks Prove the following trigonometric identity: $(\sin A - \operatorname{cosec} A)(\cos A - \sec A) = 1/(\sin A \cos A) - \sin A \cos A$

Q109. CBSE 2026 · 3 marks (b) x and y are complementary angles such that $x : y = 1 : 2$. Express the given information as a system of linear equations in two variables and hence solve it.

Q110. CBSE 2026 · 3 marks Prove the following trigonometric identity: $(\sin \theta + \cos \theta)^2 + (\sin \theta - \cos \theta)^2 = 2$

Q111. CBSE 2026 · 3 marks Prove the following trigonometric identity: $= \cot A$

Q112. CBSE 2025 · 3 marks (a) Prove that: $\tan \theta + (1/\tan \theta) = 1 + \sec \theta \operatorname{cosec} \theta$ OR (b) Prove that: $(\sin \theta/(1 - \cos \theta)) + (\sin \theta/(1 + \cos \theta)) = 2 \operatorname{cosec} \theta$

Q113. CBSE 2025 · 3 marks Prove that: $(\sin A - \cos A + 1)/(\sin A + \cos A - 1) = 1/(\sec A - \tan A)$ or equivalently prove that $\cot A + \operatorname{cosec} A - 1 = \cot A(\operatorname{cosec} A - 1)$.

Q114. CBSE 2025 · 3 marks Prove that: $(\sin \theta)/(1 - \cos \theta) + (1 - \cos \theta)/(\sin \theta) = 1 + \sec \theta \operatorname{cosec} \theta$

Q115. CBSE 2025 · 3 marks Prove that: $(\sin \theta + \cos \theta)^2 + (\sin \theta - \cos \theta)^2 = 2$

Q116. CBSE 2025 · 3 marks (a) If $\tan \theta + \sin \theta = m$ and $\tan \theta - \sin \theta = n$, then prove that $m^2 - n^2 = 4\sqrt{(mn)}$.

Q117. CBSE 2025 · 3 marks (a) Prove that: $\sin^2 \theta/(1 - \sin^2 \theta) = \tan^2 \theta + \cot^2 \theta$

Q118. CBSE 2025 · 3 marks Prove that: $\sin A/(1 + \cos A) + (1 + \cos A)/\sin A = 2 \operatorname{cosec} A$

Q119. CBSE 2025 · 3 marks (a) Prove that: $\sin A/(1 - \cos A) + \tan A/(\sin A) = 2 \operatorname{cosec} A$ OR (b) Prove that: $(\sin \theta - \cos \theta + 1)/(\sin \theta + \cos \theta - 1) = (1 + \sin \theta)/\cos \theta$

Q120. CBSE 2024 · 3 marks Prove that: $(1 - \tan \theta)/\cot \theta + (1 - \cot \theta)/\tan \theta = 1 + \tan \theta + \cot \theta$

Q121. CBSE 2024 · 3 marks Prove that $(1 + \sec \theta - \tan \theta)/(1 + \sec \theta + \tan \theta) = (1 - \sin \theta)/\cos \theta$.

Q122. CBSE 2024 · 3 marks Prove that $\sin^6 \theta + \cos^6 \theta = 1 - 3 \sin^2 \theta \cos^2 \theta$.

Q123. CBSE 2024 · 3 marks Prove that $(\operatorname{cosec}^2 \theta - \sec^2 \theta)/(\operatorname{cosec}^2 \theta + \sec^2 \theta) = 3/4$, if $\tan \theta = 1/\sqrt{7}$.

Q124. CBSE 2024 · 3 marks Prove that $(\sin \theta - 2 \sin^3 \theta)/(2 \cos^3 \theta - \cos \theta) = \tan \theta$.

Q125. CBSE 2024 · 3 marks Prove that $(\sin A + \cos A)/(\sin A - \cos A) + (\sin A - \cos A)/(\sin A + \cos A) = 2/(2\sin^2 A - 1)$

Q126. CBSE 2024 · 3 marks Prove that: $(\operatorname{cosec} \theta - \sin \theta)(\sec \theta - \cos \theta)(\tan \theta + \cot \theta) = 1$

Q127. CBSE 2024 · 3 marks Prove that $(\sin \theta - \cos \theta + 1)/(\sin \theta + \cos \theta - 1) = 1/(\sec \theta - \tan \theta)$

Q128. CBSE 2024 · 3 marks If $\sin \theta + \cos \theta = p$ and $\sec \theta + \operatorname{cosec} \theta = q$, then prove that $q(p^2 - 1) = 2p$.

Q129. CBSE 2024 · 3 marks Prove that $\sec^2 \theta + \operatorname{cosec}^2 \theta = \tan \theta + \cot \theta$.

Q130. CBSE 2024 · 3 marks Prove that: $(\tan A/(1 - \cot A)) + (\cot A/(1 - \tan A)) = 1 + \sec A \operatorname{cosec} A$

Q131. CBSE 2024 · 3 marks Prove that: $(\sin \theta + 1 + \cos \theta)/(1 + \cos \theta + \sin \theta) = 2 \operatorname{cosec} \theta$

Q132. CBSE 2024 · 3 marks Prove that: $(\tan \theta - \cot \theta)/(\sin \theta \cos \theta) = \sec^2 \theta - \operatorname{cosec}^2 \theta$

Q133. CBSE 2024 · 3 marks Prove that $(\tan \theta - \cot \theta)/(\tan \theta + \cot \theta) = 1 + \sec \theta \operatorname{cosec} \theta$

Q134. CBSE 2023 · 3 marks Prove that: $(\cos \theta)/(\cos \theta - 1) - (\sin \theta)/(\sin \theta - 1) = \cot \theta - \tan \theta$.

Q135. CBSE 2023 · 3 marks Prove that: $\cos \theta/(1 - \sin \theta) + \sin \theta/(\cos \theta - 1) = 2 \operatorname{cosec} \theta$

Q136. CBSE 2023 · 3 marks Prove that: $\tan \theta/(1 - \cos^2 \theta) + \cos \theta/\sin \theta \cdot \sin^3 \theta = 1 + \sin \theta/\cos \theta$



Q137. CBSE 2023 · 3 marks Prove that $(\sin^3 A - 2\sin A) / (2\cos A - \cos^3 A) = \tan A$

Q138. CBSE 2023 · 3 marks (A) Prove that $(\sin^3 A - 2\sin A) / (2\cos A - \cos^3 A) = \tan A$ OR (B) Prove that $\sec A (1 - \sin A) (\sec A + \tan A) = 1$.

Q139. CBSE 2023 · 3 marks Prove that: $\cot \theta / (1 - \tan \theta) + \tan \theta / (1 - \cot \theta) = 1 + \sec \theta \operatorname{cosec} \theta$

Q140. CBSE 2023 · 3 marks Prove that: $(\sec A - 1) / (\tan A) - (\tan A) / (\sec A - 1) = 2 \operatorname{cosec} A$

CASE-BASED (2)

CASE STUDY · CBSE 2026

Kite festival is a popular festival in India which takes place during Makar Sankranti. The festival is celebrated by people flying kites from their rooftops. Reena and Ravi are also flying kites to enjoy the festival. Reena is flying a kite from the ground. The string to the kite is temporarily tied to a point on the ground, and the inclination of the string with the ground is 30° . Ravi is flying a kite from a 10 m high building. His kite is also flying 60 m above the ground and is at a horizontal distance of d m from the building.

Q141. CBSE 2026 · 1 mark (ii) Find the value of $\sin \theta$.

Q142. CBSE 2026 · 1 mark Find the length of string used by Reena.

9 Some Applications of Trigonometry

Notes & MCQs →

MULTIPLE CHOICE AND ASSERTION-REASON (15)

Q1. CBSE 2026 · 1 mark The length of a pendulum is 70 cm and it describes an arc of length 88 cm when swings. The angle subtended by the arc at the centre is

- (a) 36° (b) 70° (c) 72° (d) 80°

Q2. CBSE 2026 · 1 mark The angle of elevation from 30° to 60° will:

- (a) become shorter (b) become longer (c) remain same (d) be doubled

Q3. CBSE 2025 · 1 mark A kite is flying at a height of 150 m from the ground. It is attached to a string inclined at an angle of 30° to the horizontal. The length of the string is:

- (a) 100 m (b) 300 m (c) 150 m (d) $150\sqrt{2}$ m

Q4. CBSE 2025 · 1 mark A ladder 14 m long leans against a wall. If the foot of the ladder is 7 m from the wall, then the angle of elevation of the top of the wall is:

- (a) 15° (b) 30° (c) 45° (d) 60°

Q5. CBSE 2025 · 1 mark Assertion (A): A ladder leaning against a wall, stands at a horizontal distance of 6 m from the wall. If the height of the wall up to which the ladder reaches is 8 m, then the length of the ladder is 10 m. Reason (R): The ladder makes an angle of 60° with the ground.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q6. CBSE 2024 · 1 mark A ladder 14 m long just reaches the top of a vertical wall. If the ladder makes an angle of 60° with the wall, then the height of the wall is:

- (a) $14\sqrt{3}$ m (b) 7 m (c) 14 m (d) $7\sqrt{3}$ m

Q7. CBSE 2024 · 1 mark From a point on the ground, which is 30 m away from the foot of a vertical tower, the angle of elevation of the top of the tower is found to be 60° . The height (in metres) of the tower is:

- (a) $10\sqrt{3}$ (b) $30\sqrt{3}$ (c) 60 (d) 30

Q8. CBSE 2024 · 1 mark At some time of the day, the length of the shadow of a tower is equal to its height. Then, the Sun's altitude at that time is:

- (a) 30° (b) 45° (c) 60° (d) 90°

Q9. CBSE 2024 · 1 mark If a vertical pole of length 7.5 m casts a shadow 5 m long on the ground and at the same time, a tower casts a shadow 24 m long, then the height of the tower is:

- (a) 20 m (b) 40 m (c) 60 m (d) 36 m

Q10. CBSE 2024 · 1 mark The ratio of the length of a pole and its shadow on the ground is $1 : \sqrt{3}$. The angle of elevation of the Sun is:

- (a) 90° (b) 60° (c) 45° (d) 30°

Q11. CBSE 2024 · 1 mark The length of the shadow of a tower on the plane ground is 3 times the height of the tower. The angle of elevation of the Sun is:

- (a) 30° (b) 45° (c) 60° (d) 90°

Q12. CBSE 2024 · 1 mark A pole $7\sqrt{3}$ m high casts a shadow 21 m long on the ground, then the sun's elevation is:

- (a) 30° (b) 45° (c) 60° (d) 90°

Q13. CBSE 2023 · 1 mark The hour-hand of a clock is 6 cm long. The angle swept by it between 7:20 a.m. and 7:55 a.m. is:

- (a) 43.5° (b) 23.5° (c) 35° (d) 70°

Q14. CBSE 2023 · 1 mark If a pole 6 m high casts a shadow $2\sqrt{3}$ m long on the ground, then sun's elevation is:

- (a) 60° (b) 45° (c) 30° (d) 90°

Q15. CBSE 2023 · 1 mark Water in a river which is 3 m deep and 40 m wide is flowing at the rate of 2 km/h. How much water will fall into the sea in 2 minutes?

- (a) 800 m^3 (b) 4000 m^3 (c) 8000 m^3 (d) 2000 m^3

VERY SHORT ANSWER (2)

Q16. CBSE 2026 · 2 marks A vertical pole of height 10 m casts a shadow of 15 m on the ground and at the same time, a tower casts a shadow of 45 m on the ground. Find the height of the tower.



Q17. CBSE 2023 · 2 marks The length of the shadow of a tower on the plane ground is 3 times the height of the tower. Find the angle of elevation of the sun.

SHORT ANSWER (5)

Q18. CBSE 2026 · 3 marks Chord AB of a circle subtends an angle of 120° at the centre O of the circle. Find the length of arc AB, if radius of the circle is 21 cm.

Q19. CBSE 2022 · 3 marks The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60° . If the tower is 50 m high, then find the height of the building.

Q20. CBSE 2022 · 3 marks The tops of two poles of heights 20 m and 28 m are connected with a wire. The wire is inclined to the horizontal at an angle of 30° . Find the length of the wire and the distance between the two poles.

Q21. CBSE 2022 · 3 marks A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground making an angle of 30° with it. The height of the breaking point from the ground is 2 m. Find the total height of the tree.

Q22. CBSE 2022 · 3 marks A tower stands vertically on the ground. From a point on the ground, which is 15 m away from the foot of the tower, the angle of elevation of the top of the tower is 60° . Find the height of the tower.

LONG ANSWER (31)

Q23. CBSE 2026 · 5 marks The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60° . If the tower is 60 m high, find the height of the building and distance between the building and the tower. (Use $\sqrt{3} = 1.73$)

Q24. CBSE 2026 · 5 marks A statue, 2 m tall, stands on the top of a pedestal. From a point on the ground, the angle of elevation of the top of the statue is 60° and from the same point the angle of elevation of the bottom of the statue is 45° . Find the height of the pedestal and its distance from the point of observation on the ground. (use $\sqrt{3} = 1.73$)

Q25. CBSE 2026 · 5 marks A straight road leads to foot of a tower whose shadow is found to be 40 m longer when sun's altitude is 30° than when it is 60° . Find the height of the tower and length of shadow in both the situations. (Use $\sqrt{3} = 1.73$)

Q26. CBSE 2026 · 5 marks Two poles of equal heights are standing opposite each other on either side of the road, which is 80 m wide. From a point between them on the road, the angles of elevation of the top of the poles are 60° and 30° respectively. Find the height of the poles and the distance of the point from the poles.

Q27. CBSE 2026 · 5 marks Two poles of equal heights are standing opposite each other on either side of the road, which is 80 m wide. From a point between them on the road, the angles of elevation of the top of the poles are 60° and 30° respectively. Find the height of the poles and the distance of the point from the poles.

Q28. CBSE 2026 · 5 marks Two poles of equal heights are standing opposite to each other on either side of the road which is 90 m wide. From a point between them on the road, the angles of elevation of the top of the poles are 30° and 60° respectively. Find the height of the poles and the distances of the point from the poles. [Use $\sqrt{3} = 1.732$]

Q29. CBSE 2026 · 5 marks The angle of elevation of the top of a tower as observed from a point in a horizontal plane through the foot of the tower is 30° . When the observer moves towards the tower a distance of 100 m, he finds the angle of elevation of the top to be 60° . Find the height of the tower and the distance of first position from the tower.

Q30. CBSE 2025 · 5 marks Two ships are sailing in the sea on either side of a lighthouse. The angles of depression to the two ships as observed from the top of the lighthouse are 60° and 45° , respectively. If the distance between the ships is $100\sqrt{3}$ m, then find the height of the lighthouse.

Q31. CBSE 2025 · 5 marks (a) The angle of elevation of an airborne helicopter from a point A on the ground is 45° . After a flight of 15 seconds, the angle of elevation of the helicopter changes to 30° . If the helicopter is flying at a constant height of 2000 m, find the speed of the helicopter. (Take $\sqrt{3} = 1.732$)

Q32. CBSE 2024 · 5 marks From the top of a 45 m high light house, the angles of depression of two ships, on the opposite side of it, are observed to be 30° and 60° . If the line joining the ships passes through the foot of the light house, find the distance between the ships. (Use $\sqrt{3} = 1.73$)

Q33. CBSE 2024 · 5 marks The angle of elevation of an aircraft from a point A on the ground is 60° . After a flight of 30 seconds, the angle of elevation changes to 30° . The aircraft is flying at a constant height of $3500\sqrt{3}$ m at a uniform speed. Find the speed of the aircraft.

Q34. CBSE 2024 · 5 marks A person standing on the bank of a river observes that the angle of elevation of the top of a tower on the opposite bank is 60° . When he moves 30 m away from the bank, he finds the angle of elevation to be 30° . Find the height of the tower and width of the river. (Take $\sqrt{3} = 1.732$)

Q35. CBSE 2024 · 5 marks From a point on the ground, the angles of elevation of the bottom and the top of a transmission tower fixed at the top of a 20 m high building are 45° and 60° respectively. Find the height of the tower.

Q36. CBSE 2024 · 5 marks The angle of elevation of a jet plane from a point A on the ground is 60° . After a flight of 30 seconds, the angle of elevation changes to 30° . If the jet plane is flying at a constant height of $3600\sqrt{3}$ m, find the speed of the jet plane.

Q37. CBSE 2024 · 5 marks A man on a cliff observes a boat at an angle of depression of 30° which is approaching the shore to the point immediately beneath the observer with a uniform speed. Six minutes later, the angle of depression of the boat is found to be 60° . Find the time taken by the boat from here to reach the shore.



Q38. CBSE 2024 · 5 marks Two pillars of equal lengths stand on either side of a road which is 100 m wide, exactly opposite to each other. At a point on the road between the pillars, the angles of elevation of the tops of the pillars are 60° and 30° . Find the length of each pillar and distance of the point on the road from the pillars. (Use $\sqrt{3} = 1.732$)

Q39. CBSE 2024 · 5 marks The angles of depression of the top and the bottom of a 50 m high building from the top of a tower are 45° and 60° , respectively. Find the height of the tower. (Use $\sqrt{3} = 1.73$)

Q40. CBSE 2024 · 5 marks The angles of depression of the top and the bottom of a 8 m tall building from the top of a multi-storeyed building are 30° and 45° respectively. Find the height of the multi-storeyed building and the distance between the two buildings.

Q41. CBSE 2024 · 5 marks From a point on a bridge across the river, the angles of depressions of the banks on opposite sides of the river are 30° and 60° respectively. If the bridge is at a height of 4 m from the banks, find the width of the river.

Q42. CBSE 2024 · 5 marks From a window 15 metres high above the ground in a street, the angles of elevation and depression of the top and the foot of another house on the opposite side of the street are 30° and 45° respectively. Find the height of the opposite house. (Use $\sqrt{3} = 1.732$)

Q43. CBSE 2024 · 5 marks From the top of a 7 m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 45° . Determine the height of the tower. (Use $\sqrt{3} = 1.732$)

Q44. CBSE 2023 · 5 marks As observed from the top of a 75 m high lighthouse from the sea-level, the angles of depression of two ships are 30° and 60° . If one ship is exactly behind the other on the same side of the lighthouse, find the distance between the two ships. (Use $\sqrt{3} = 1.73$)

Q45. CBSE 2023 · 5 marks (a) The angle of elevation of the top of a tower 30 m high from the foot of another tower in the same plane is 60° and the angle of elevation of the top of the second tower from the foot of the first tower is 30° . Find the distance between the two towers and also the height of the other tower.

Q46. CBSE 2023 · 5 marks A straight highway leads to the foot of a tower. A man standing on the top of the 75 m high tower observes two cars at angles of depression of 30° and 60° , which are approaching the foot of the tower. If one car is exactly behind the other on the same side of the tower, find the distance between the two cars. (use $\sqrt{3} = 1.73$)

Q47. CBSE 2023 · 5 marks (A) A straight highway leads to the foot of a tower. A man standing on the top of the 75 m high tower observes two cars at angles of depression of 30° and 60° , which are approaching the foot of the tower. If one car is exactly behind the other on the same side of the tower, find the distance between the two cars. (use $\sqrt{3} = 1.73$) OR (B) From the top of a 7 m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 30° . Determine the height of the tower.

Q48. CBSE 2023 · 5 marks One observer estimates the angle of elevation to the basket of a hot air balloon to be 60° , while another observer 100 m away estimates the angle of elevation to be 30° . Find: (a) The height of the basket from the ground. (b) The distance of the basket from the first observer. (c) The horizontal distance of the second observer from the basket.

Q49. CBSE 2023 · 5 marks The angle of elevation of the top of a vertical tower from a point P on the ground is 60° . From another point Q, 10 m vertically above the first point P, its angle of elevation is 30° . Find: (a) The height of the tower. (b) The distance of the point P from the foot of the tower. (c) The distance of the point P from the top of the tower.

Q50. CBSE 2023 · 5 marks Two pillars are standing on either side of a 80 m wide road. Height of one pillar is 20 m more than the height of the other pillar. From a point on the road between the pillars, the angle of elevation of the higher pillar is 60° , whereas that of the other pillar is 30° . Find the position of the point between the pillars and the height of each pillar. (Use $\sqrt{3} = 1.73$)

Q51. CBSE 2022 · 4 marks A straight highway leads to the foot of a tower. A man standing at the top of the tower observes a car at an angle of depression of 30° , which is approaching the foot of the tower with a uniform speed. Ten seconds later, the angle of depression of the car is found to be 60° . Find the time taken by the car to reach the foot of the tower from this point.

Q52. CBSE 2022 · 4 marks The angle of elevation of an aeroplane from a point on the ground is 60° . After a flight of 30 seconds, the angle of elevation from the same point becomes 30° . If the aeroplane is flying at a constant height of $3000\sqrt{3}$ m, find the speed of the aeroplane.

Q53. CBSE 2022 · 4 marks The angle of elevation of the top Q of a vertical tower PQ from a point X on the ground is 60° . From a point Y, 40 m vertically above X, the angle of elevation of the top Q of tower PQ is 45° . Find the height of the tower PQ and the distance PX. [Use $\sqrt{3} = 1.73$]

CASE-BASED (8)

CASE STUDY · CBSE 2026

An injured bird was found on the roof of a building. The building is 15 m high. A fireman was called to rescue the bird. The fireman used an adjustable ladder to reach the roof. He placed the ladder in such a way that the ladder makes an angle of 60° with the ground in order to reach the roof.

Q54. CBSE 2026 · 1 mark Find the length of the ladder used by the fireman to reach the roof.

CASE STUDY · CBSE 2026

Kite festival is a popular festival in India which takes place during Makar Sankranti. The festival is celebrated by people flying kites from their rooftops. Reena and Ravi are also flying kites to enjoy the festival. Reena is flying a kite from the ground. The string to the kite is temporarily tied to a point on the ground, and the inclination of the string with the ground is 30° . Ravi is flying a kite from a 10 m high building. His kite is also



flying 60 m above the ground and is at a horizontal distance of d m from the building.

Q55. CBSE 2026 · 1 mark (i) Find the length of string used by Reena.

CASE STUDY · CBSE 2026

Kite festival is a popular festival in India which takes place during Makar Sankranti. The festival is celebrated by people flying kites from their rooftops. Reena and Ravi are also flying kites to enjoy the festival. Reena's kite is 60 m above the ground. The string attached to the kite is temporarily tied to a point on the ground, and the inclination of the string with the ground is 30° . Ravi is flying a kite from a 10 m high building. His kite is also flying 60 m above the ground and the length of the string used by Ravi is same as that of Reena.

Q56. CBSE 2026 · 1 mark (i) Find the length of string used by Reena.

CASE STUDY · CBSE 2026

Two motorboats A and B are waiting at the opposite banks of a river in order to reach the opposite side. From a point P on the bridge, 20 m above the river, the angles of depression of the boats are 30° and 45° respectively. Both the boats leave at the same time at the speed of 10 m/s and 5 m/s, respectively.

Q57. CBSE 2026 · 1 mark Find the distance travelled by boat A to reach point D in the river, vertically below the point P. (Use $\sqrt{3} = 1.73$)

CASE STUDY · CBSE 2025

Amrita stood near the base of a lighthouse, gazing up at its towering height. She measured the angle of elevation to the

top and found it to be 60° . Then, she climbed a nearby observation deck, 40 metres higher than her original position and noticed the angle of elevation to the top of lighthouse to be 45° .

Q58. CBSE 2025 · 1 mark Let $CD = h$, find BD in terms of h .

Q59. CBSE 2025 · 4 marks (i) Find the height CD in terms of h , where $BD = h$.

CASE STUDY · CBSE 2025

A lighthouse stands tall on a cliff by the sea, watching over ships that pass by. One day a ship is seen approaching the shore and from the top of the lighthouse, the angles of depression of the ship are observed to be 30° and 45° as it moves from point P to point Q. The height of the lighthouse is 50 metres.

Q60. CBSE 2025 · 1 mark Find the distance of the ship from the base of the lighthouse when it is at point Q, where the angle of depression is 45° .

CASE STUDY · CBSE 2024

Radio towers are used for transmitting a range of communication services including radio and television. The tower will either act as an antenna itself or support one or more antennas on its structure. On a similar concept, a radio station tower was built in two stations A and B (B vertically below A). The tower is supported by wires AO and BO from a point O on the ground. Distance between the base C of the tower and the point O is 36 m. From O, the angles of elevation of the tops of station B and station A are 30° and 45° respectively.

Q61. CBSE 2024 · 4 marks (i) Find the height of station B.

10 Circles

Notes & MCQs →

MULTIPLE CHOICE AND ASSERTION-REASON (28)

Q1. CBSE 2026 · 1 mark PT is tangent to the circle with centre O and radius 5 cm. OP intersects the circle at Q. If $PQ = x$, then PT^2 equals:

- (a) $x^2 + 5x$ (b) $x^2 + 10x + 50$ (c) $x^2 + 10x$ (d) $x^2 - 25$

Q2. CBSE 2026 · 1 mark A chord QR subtends an angle of 105° at the centre O of the circle. The measure of $\angle RQP$ is

- (a) $75^\circ/2$ (b) $105^\circ/2$ (c) 75° (d) 15°

Q3. CBSE 2026 · 1 mark PQ is tangent to a circle at a point P on the circle. The number of tangents which can be drawn to the circle parallel to PQ, is

- (a) 2 (b) 1 (c) many (d) zero

Q4. CBSE 2026 · 1 mark A chord QR subtends an angle of 105° at the centre O of the circle. The measure of $\angle RQP$ is

- (a) $75^\circ/2$ (b) $105^\circ/2$ (c) 75° (d) 15°

Q5. CBSE 2026 · 1 mark PQ is tangent to the circle with centre O such that $OP = 2OQ$. $m\angle OPQ$ is

- (a) 15° (b) 60° (c) 45° (d) 30°

Q6. CBSE 2026 · 1 mark Four tangents drawn to a circle are extended from both the sides to form a quadrilateral. Which of these quadrilateral is not possible?

- (a) Trapezium (b) Square (c) Rectangle (d) Rhombus

Q7. CBSE 2026 · 1 mark From a point P, tangents PQ and PR are drawn to a circle with centre O and radius 6 cm. If $OP = 10$ cm, then area of quadrilateral PQOR is:

- (a) 48 cm² (b) 24 cm² (c) 96 cm² (d) 72 cm²

Q8. CBSE 2026 · 1 mark If two tangents inclined at an angle of 60° are drawn from an external point to a circle of radius 6 cm, then the length of each tangent is:

- (a) $3\sqrt{3}$ cm (b) 6 cm (c) 12 cm (d) $6\sqrt{3}$ cm



Q9. CBSE 2026 · 1 mark In two concentric circles with centre O, the radius of outer circle is 25 cm. Chord PQ of the outer circle is tangent to the inner circle at R. If $PQ = 14$ cm, then the radius of the inner circle is:

- (a) $\sqrt{429}$ cm (b) 24 cm (c) $\sqrt{674}$ cm (d) 20 cm

Q10. CBSE 2026 · 1 mark If the distance of a tangent to a circle from its centre is 4 cm, then the length of diameter of the circle is :

- (a) 2 cm (b) 4 cm (c) 8 cm (d) 16 cm

Q11. CBSE 2026 · 1 mark In two concentric circles, a tangent to the smaller circle will intersect the larger circle at:

- (a) zero point (b) one point (c) two points
(d) three points

Q12. CBSE 2025 · 1 mark The tangents drawn at the extremities of the diameter of a circle are always:

- (a) parallel (b) perpendicular (c) equal (d) intersecting

Q13. CBSE 2025 · 1 mark If the length of a chord of a circle is equal to its radius, then the angle subtended by chord at the centre is:

- (a) 60° (b) 30° (c) 120° (d) 90°

Q14. CBSE 2025 · 1 mark The coordinates of the end points of a diameter of a circle are (5, -2) and (5, 2). The length of the radius of the circle is:

- (a) ± 2 (b) ± 4 (c) 4 (d) 2

Q15. CBSE 2025 · 1 mark If tangents PA and PB drawn from an external point P to the circle with centre O are inclined to each other at an angle of 80° , then the measure of angle POA is:

- (a) 40° (b) 50° (c) 60° (d) 80°

Q16. CBSE 2025 · 1 mark Assertion (A): If two tangents are drawn to a circle from an external point, then they subtend equal angles at the centre of the circle. Reason (R): A parallelogram circumscribing a circle is a rhombus.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q17. CBSE 2025 · 1 mark If tangents PA and PB drawn from an external point P to the circle with centre O are inclined to each other at an angle of 80° , then the measure of $\angle POA$ is:

- (a) 40° (b) 50° (c) 60° (d) 80°

Q18. CBSE 2024 · 1 mark If two tangents inclined at an angle of 60° are drawn to a circle of radius 5 cm, then the length of each tangent is:

- (a) $5\sqrt{3}/2$ cm (b) 10 cm (c) $3/5$ cm (d) $5\sqrt{3}$ cm

Q19. CBSE 2024 · 1 mark AB and CD are two chords of a circle intersecting at P. Choose the correct statement from the following:

- (a) $\triangle ADP \sim \triangle CBA$ (b) $\triangle ADP \sim \triangle BPC$ (c) $\triangle ADP \sim \triangle BCP$
(d) $\triangle ADP \sim \triangle CBP$

Q20. CBSE 2024 · 1 mark Maximum number of common tangents that can be drawn to two circles intersecting at two distinct points is:

- (a) 4 (b) 3 (c) 2 (d) 1

Q21. CBSE 2024 · 1 mark If an arc subtends an angle of 90° at the centre of a circle, then the ratio of its length to the circumference of the circle is:

- (a) 2 : 3 (b) 1 : 4 (c) 4 : 1 (d) 1 : 3

Q22. CBSE 2024 · 1 mark The area of the square inscribed in a circle of radius $2\sqrt{5}$ cm is:

- (a) 50 cm^2 (b) 100 cm^2 (c) 25 cm^2 (d) 200 cm^2

Q23. CBSE 2024 · 1 mark The length of an arc of a circle with radius 12 cm is 10π cm. The angle subtended by the arc at the centre of the circle, is:

- (a) 120° (b) 6° (c) 75° (d) 150°

Q24. CBSE 2024 · 1 mark A chord of a circle of radius 10 cm subtends a right angle at its centre. The length of the chord (in cm) is:

- (a) $2\sqrt{5}$ (b) $2\sqrt{10}$ (c) $\sqrt{5}$ (d) 5

Q25. CBSE 2024 · 1 mark A line intersecting a circle in two distinct points is called a

- (a) secant (b) chord (c) diameter (d) tangent

Q26. CBSE 2023 · 1 mark Assertion (A): A tangent to a circle is perpendicular to the radius through the point of contact. Reason (R): The lengths of tangents drawn from an external point to a circle are equal.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q27. CBSE 2023 · 1 mark Assertion (A): If PA and PB are tangents drawn from an external point P to a circle with centre O, then the quadrilateral AOBP is cyclic. Reason (R): The angle between two tangents drawn from an external point to a circle is supplementary to the angle subtended by the line segment joining the points of contact at the centre.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q28. CBSE 2023 · 1 mark The length of tangent drawn to a circle of radius 9 cm from a point 41 cm from the centre is:

- (a) 40 cm (b) 9 cm (c) 41 cm (d) 50 cm

VERY SHORT ANSWER (9)

Q29. CBSE 2026 · 2 marks A circle is inscribed in a right triangle ABC, right angled at B. If the lengths of the two sides containing the right angle are 8 cm and 15 cm, find the radius of the incircle.



Q30. CBSE 2026 · 2 marks Two concentric circles are of radii 6 cm and 10 cm. Find the length of the chord of the larger circle which touches the smaller circle.

Q31. CBSE 2026 · 2 marks Prove that the tangent drawn at any point of the circle is perpendicular to the radius through the point of contact.

Q32. CBSE 2025 · 2 marks A person is standing at P outside a circular ground at a distance of 26 m from the centre of the ground. He found that his distances from the points A and B on the ground are 10 m (PA and PB are tangents to the circle). Find the radius of the circular ground.

Q33. CBSE 2025 · 2 marks At point A on the diameter AB of a circle of radius 10 cm, tangent XAY is drawn to the circle. Find the length of the chord CD parallel to XY at a distance of 16 cm from A.

Q34. CBSE 2024 · 2 marks If a hexagon ABCDEF circumscribes a circle, prove that $AB + CD + EF = BC + DE + FA$.

Q35. CBSE 2024 · 2 marks (a) If two tangents inclined at an angle of 60° are drawn to a circle of radius 3 cm, then find the length of each tangent.

Q36. CBSE 2024 · 2 marks Prove that the tangents drawn at the ends of a diameter of a circle are parallel to each other.

Q37. CBSE 2023 · 2 marks Prove that the tangents drawn at the ends of a diameter of a circle are parallel.

SHORT ANSWER (21)

Q38. CBSE 2026 · 3 marks Prove that a parallelogram circumscribing a circle, is a rhombus.

Q39. CBSE 2026 · 3 marks Two tangents TP and TQ are drawn to a circle with centre O, from an external point T. Prove that $\angle PTQ = 2\angle OPQ$.

Q40. CBSE 2026 · 3 marks Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

Q41. CBSE 2026 · 3 marks Chord AB of a circle subtends an angle of 120° at the centre O of the circle. Find the length of arc AB, if radius of the circle is 21 cm.

Q42. CBSE 2026 · 3 marks A circle touches the side BC of a triangle ABC at P and also touches the sides AB and AC produced at Q and R respectively. Prove that $AR = \frac{1}{2}$ (perimeter of ABC).

Q43. CBSE 2024 · 3 marks A circle is inscribed in a right-angled triangle ABC, right-angled at B. If $BC = 7$ cm and $AB = 24$ cm, find the radius of the circle.

Q44. CBSE 2024 · 3 marks Prove that the tangents drawn at the end points of a chord of a circle makes equal angles with the chord.

Q45. CBSE 2024 · 3 marks From an external point P, two tangents PA and PB are drawn to the circle with centre O. Prove that OP is the perpendicular bisector of chord AB.

Q46. CBSE 2024 · 3 marks Prove that the parallelogram circumscribing a circle is a rhombus.

Q47. CBSE 2024 · 3 marks (a) In two concentric circles, a chord of length 24 cm of larger circle touches the smaller circle, whose radius is 5 cm. Find the radius of the larger circle.

Q48. CBSE 2023 · 3 marks Prove that the angle between the two tangents drawn from an external point to a circle is supplementary to the angle subtended by the line-segment joining the points of contact at the centre.

Q49. CBSE 2023 · 3 marks Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.

Q50. CBSE 2023 · 3 marks From an external point, two tangents are drawn to a circle. Prove that the line joining the external point to the centre of the circle bisects the angle between the two tangents.

Q51. CBSE 2022 · 2 marks Two concentric circles are of radii 4 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.

Q52. CBSE 2022 · 3 marks Draw a circle of radius 3 cm. Take two points P and Q on one of its extended diameter each at a distance of 7 cm from its centre. Construct tangents to the circle from these two points P and Q.

Q53. CBSE 2022 · 3 marks Construct a pair of tangents to a circle of radius 5 cm, which are inclined to each other at an angle of 60° .

Q54. CBSE 2022 · 3 marks Draw a circle of radius 3 cm. From a point P lying outside the circle at a distance of 6 cm from its centre, construct two tangents PA and PB to the circle.

Q55. CBSE 2022 · 3 marks Draw a circle of radius 4 cm. Construct a pair of tangents to the circle from a point 6 cm away from its centre.

Q56. CBSE 2022 · 3 marks Draw a circle of radius 3 cm. Take a point P at a distance of 8 cm from the centre of the circle. Construct a pair of tangents from the point P to the circle.

Q57. CBSE 2022 · 3 marks Draw two concentric circles of radii 5 cm and 2 cm. From a point P on the outer circle, construct a pair of tangents to the inner circle.

Q58. CBSE 2022 · 3 marks Draw a circle of radius 2.5 cm. From a point P lying outside the circle at a distance of 6 cm from the centre of the circle, construct tangents PA and PB to the circle.

LONG ANSWER (4)

Q59. CBSE 2026 · 5 marks PQ and PR are two tangents to a circle with centre O and radius 5 cm. AB is another tangent to the circle at C which lies on OP. If $OP = 13$ cm, then find the length AB and PA.

Q60. CBSE 2023 · 5 marks Two circles with centres O and O' of radii 6 cm and 8 cm, respectively intersect at two points P and Q such that OP and O'P are tangents to the two circles. Find the length of the common chord PQ.

Q61. CBSE 2023 · 5 marks A triangle ABC is drawn to circumscribe a circle of radius 4 cm such that the segments BD and DC are of lengths 10 cm and 8 cm respectively. Find the lengths of the sides AB and AC, if it is given that the area of triangle ABC is 90 cm^2 .



Q62. CBSE 2023 · 5 marks (a) A triangle ABC is drawn to circumscribe a circle of radius 4 cm such that the segments BD and DC are of lengths 10 cm and 8 cm respectively. Find the lengths of the sides AB and AC, if the area of triangle ABC is 90 cm^2 . OR (b) Two circles with centres O and O' of radii 6 cm and 8 cm, respectively intersect at two points P and Q such that OP and O'P are tangents to the two circles. Find the length of the common chord PQ.

CASE-BASED (2)

CASE STUDY · CBSE 2026

In a circular museum hall of radius 14 m, some statues are displayed. Statues are kept inside the inner concentric circle of radius 7 m. One such statue lying in sector OAB, is fenced along

line segments OA, AP, PB and BO where P is a point on outer circle.

Q63. CBSE 2026 · 1 mark Find $m\angle AOP$.

Q64. CBSE 2024 · 1 mark Assertion (A): If the circumference of a circle is 176 cm, then its radius is 28 cm. Reason (R): Circumference = $2\pi \times$ radius of a circle.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
- (b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
- (c) Assertion (A) is true, but Reason (R) is false.
- (d) Assertion (A) is false, but Reason (R) is true.

11 Areas Related to Circles

Notes & MCQs →

MULTIPLE CHOICE AND ASSERTION-REASON (32)

Q1. CBSE 2026 · 1 mark Chord AB subtends an angle of 40° at the centre of the circle of radius 9 cm. The length of arc AB is:

- (a) $22/7 \text{ cm}$ (b) $198/7 \text{ cm}$ (c) $44/7 \text{ cm}$ (d) $54/7 \text{ cm}$

Q2. CBSE 2026 · 1 mark An arc of length 11 cm subtends an angle of 105° at the centre of the circle. The radius of the circle is:

- (a) 8 cm (b) $4\sqrt{3} \text{ cm}$ (c) 6 cm (d) 7 cm

Q3. CBSE 2026 · 1 mark The perimeter of sector of a circle of radius 21 cm and central angle 60° , is

- (a) 22 cm (b) 44 cm (c) 64 cm (d) 273 cm

Q4. CBSE 2026 · 1 mark Assertion (A) : In a circle of radius 21 cm, an arc of length 22 cm subtends an angle of 60° at the centre. Reason (R) : The length of arc of a sector of a circle of radius r and central angle θ is $2\pi r\theta/360$.

- (a) Both, Assertion (A) and Reason (R) are true and Reason (R) is correct explanation of Assertion (A).
- (b) Both, Assertion (A) and Reason (R) are true, but Reason (R) is not correct explanation for Assertion (A).
- (c) Assertion (A) is true, but Reason (R) is false.
- (d) Assertion (A) is false, but Reason (R) is true.

Q5. CBSE 2026 · 1 mark The area (in cm^2) of a sector of a circle of radius 14 cm cut off by an arc of length 22 cm is:

- (a) 77 (b) 308 (c) 154 (d) 462

Q6. CBSE 2026 · 1 mark The minute hand of a clock is 21 cm long. The distance covered by the tip of minute hand from 2:10 pm to 2:25 pm is:

- (a) 346.5 cm (b) 33 cm (c) 66 cm (d) 16.5 cm

Q7. CBSE 2026 · 1 mark An arc of length 2.2 cm subtends an angle θ at the centre of the circle with radius 2.8 cm. The value of θ is

- (a) 50° (b) 60° (c) 45° (d) 30°

Q8. CBSE 2026 · 1 mark The ratio of the area of a quadrant of a circle to the area of the same circle is:

- (a) 1 : 2 (b) 2 : 1 (c) 1 : 4 (d) 4 : 1

Q9. CBSE 2026 · 1 mark The perimeter of a quadrant of a circle of radius r is:

- (a) πr^2 (b) $\pi r^2 + 2r$ (c) $\pi r/2 + 2r$ (d) $\pi r + 2r$

Q10. CBSE 2026 · 1 mark The ratio of the area of a quadrant of a circle to the area of a circle is:

- (a) 2 : 1 (b) 1 : 2 (c) 1 : 4 (d) 4 : 1

Q11. CBSE 2026 · 1 mark The angle of the sector of a circle whose area is one-eighth of the area of the circle is:

- (a) 30° (b) 45° (c) 60° (d) 90°

Q12. CBSE 2026 · 1 mark The perimeter of a quadrant of a circle of circumference 22 cm is:

- (a) 29 cm (b) 22 cm (c) 12.5 cm (d) 5.5 cm

Q13. CBSE 2025 · 1 mark If a sector of a circle has an area of 40 sq. units and a central angle of 72° , the radius of the circle is:

- (a) 200 units (b) 100 units (c) 20 units (d) $10\sqrt{2}$ units

Q14. CBSE 2025 · 1 mark A piece of wire 20 cm long is bent into the form of an arc of a circle of radius $\sqrt{60/\pi}$ cm. The angle subtended by the arc at the centre of the circle is:

- (a) 30° (b) 60° (c) 90° (d) 50°

Q15. CBSE 2025 · 1 mark A piece of wire 20 cm long is bent into the form of an arc of a circle of radius 60 cm. The angle subtended by the arc at the centre of the circle is:

- (a) 30° (b) 60° (c) 90° (d) 50°

Q16. CBSE 2025 · 1 mark An arc of a circle is of length 5 cm and the sector it bounds has an area of 20 cm^2 . Its radius is:

- (a) 10 cm (b) 1 cm (c) 5 cm (d) 8 cm

Q17. CBSE 2025 · 1 mark If a large circular pizza is divided into 5 equal sectors, then the central angle of each sector will be:

- (a) 60° (b) 90° (c) 45° (d) 72°

Q18. CBSE 2025 · 1 mark If an arc of a circle of diameter 10 cm subtends an angle of 144° at the centre of the circle, then the length of the arc is:

- (a) 2 cm (b) 4 cm (c) 5 cm (d) 6 cm



Q19. CBSE 2025 · 1 mark If the area of a sector of circle of radius 36 cm is $54\pi \text{ cm}^2$, then the length of the corresponding arc of the sector is:

- (a) 8 cm (b) 6 cm (c) 4 cm (d) 3 cm

Q20. CBSE 2025 · 1 mark The diameter of a wheel is 63 cm. The distance travelled by the wheel in 100 revolutions is:

- (a) 99 m (b) 198 m (c) 63 m (d) 136 m

Q21. CBSE 2024 · 1 mark If the area of a sector is one-twelfth that of a complete circle, then the angle of the sector is:

- (a) 36° (b) 30° (c) 60° (d) 45°

Q22. CBSE 2024 · 1 mark The minute hand of a clock is 21 cm long. The area swept by it in 10 minutes is:

- (a) 121 cm^2 (b) 131 cm^2 (c) 231 cm^2 (d) 172.5 cm^2

Q23. CBSE 2024 · 1 mark Perimeter of a sector of a circle whose central angle is 90° and radius 7 cm is:

- (a) 35 cm (b) 11 cm (c) 22 cm (d) 25 cm

Q24. CBSE 2024 · 1 mark If the area of a sector of a circle is $\frac{7}{20}$ of the area of the circle, then the angle at the centre is equal to:

- (a) 110° (b) 130° (c) 100° (d) 126°

Q25. CBSE 2024 · 1 mark If an arc subtends an angle of 90° at the centre of a circle, then the ratio of its length to the circumference of the circle is:

- (a) 2 : 3 (b) 1 : 4 (c) 4 : 1 (d) 1 : 3

Q26. CBSE 2024 · 1 mark The area of the sector of a circle of radius 12 cm is $60\pi \text{ cm}^2$. The central angle of this sector is:

- (a) 120° (b) 6° (c) 75° (d) 150°

Q27. CBSE 2024 · 1 mark Assertion (A): If the circumference of a circle is 176 cm, then its radius is 28 cm. Reason (R): Circumference = $2\pi \times \text{radius}$ of a circle.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
 (b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
 (c) Assertion (A) is true, but Reason (R) is false.
 (d) Assertion (A) is false, but Reason (R) is true.

Q28. CBSE 2024 · 1 mark The perimeter of the sector of a circle of radius 21 cm which subtends an angle of 60° at the centre of circle, is:

- (a) 22 cm (b) 43 cm (c) 64 cm (d) 462 cm

Q29. CBSE 2024 · 1 mark The length of an arc of a circle with radius 12 cm is $10\pi \text{ cm}$. The angle subtended by the arc at the centre of the circle, is:

- (a) 120° (b) 6° (c) 75° (d) 150°

Q30. CBSE 2024 · 1 mark The difference of the areas of a minor sector of angle 120° and its corresponding major sector of a circle of radius 21 cm, is

- (a) 231 cm^2 (b) 462 cm^2 (c) 346.5 cm^2 (d) 693 cm^2

Q31. CBSE 2023 · 1 mark What is the length of the arc of the sector of a circle with radius 14 cm and of central angle 90° ?

- (a) 22 cm (b) 44 cm (c) 88 cm (d) 11 cm

Q32. CBSE 2023 · 1 mark What is the area of a semi-circle of diameter 'd'?

- (a) $\pi d^2/16$ (b) $\pi d^2/4$ (c) $\pi d^2/8$ (d) $\pi d^2/2$

VERY SHORT ANSWER (9)

Q33. CBSE 2026 · 2 marks A chord AB of a circle of radius 14 cm makes a right angle at the centre of the circle. Find the area of the minor segment.

Q34. CBSE 2026 · 2 marks A chord of a circle of diameter 20 cm subtends an angle of 60° at the centre of the circle. Find the area of the corresponding minor segment of the circle. (Use $\pi = 3.14$ and $\sqrt{3} = 1.73$)

Q35. CBSE 2026 · 2 marks From a circular sheet of radius 70 cm, a quadrant is cut. Find the area of the remaining sheet.

Q36. CBSE 2026 · 2 marks (a) The area of a smaller circle is equal to the area of a sector of a larger circle with central angle 120° . The radii of the smaller and larger circles are r and R respectively. Find the ratio r : R.

Q37. CBSE 2026 · 2 marks (a) The area of a smaller circle is equal to the area of a sector of a larger circle with central angle 120° . The radii of the smaller and larger circles are r and R respectively. Find the relationship between r and R.

Q38. CBSE 2026 · 2 marks From a circular sheet of radius 10 cm, a quadrant is cut. Find the perimeter of the remaining sheet.

Q39. CBSE 2024 · 2 marks A horse, a cow and a goat are tied, each by ropes of length 14 m, at the corners A, B and C respectively, of a grassy triangular field ABC with sides of lengths 35 m, 40 m and 50 m. Find the total area of grass field that can be grazed by them.

Q40. CBSE 2024 · 2 marks (a) The minute hand of a clock is 14 cm long. Find the area on the face of the clock described by the minute hand in 5 minutes. OR (b) Find the length of the arc of a circle which subtends an angle of 60° at the centre of the circle of radius 42 cm.

Q41. CBSE 2024 · 2 marks (a) The minute hand of a clock is 14 cm long. Find the area on the face of the clock described by the minute hand in 5 minutes.

SHORT ANSWER (13)

Q42. CBSE 2026 · 3 marks A chord of a circle of radius 14 cm subtends a right angle at the centre. Find the area of the corresponding (i) minor segment (ii) major segment.

Q43. CBSE 2026 · 3 marks A circle of radius 12 cm is divided into 11 identical sectors. Find the total area of 7 such sectors.

Q44. CBSE 2026 · 3 marks Chord AB of a circle subtends an angle of 120° at the centre O of the circle. Find the length of arc AB, if radius of the circle is 21 cm.

Q45. CBSE 2026 · 3 marks A chord PQ of a circle of diameter 28 cm subtends an angle of 90° at the centre O. Find the area of the sector OPCQ, where C is a point on minor arc PQ. Also, find the area of segment PCQ.

Q46. CBSE 2026 · 3 marks A circle of diameter 20 cm is equally divided into five sectors. Find the area and perimeter of one of the sectors.



Q47. CBSE 2025 · 3 marks The length of the hour hand of a clock is 10 cm. Find the area of the minor sector swept by the hour hand of the clock between 5 a.m. to 8 a.m. Also, find the area of the major sector.

Q48. CBSE 2025 · 3 marks A chord of a circle of radius 10 cm subtends a right angle at the centre of the circle. Find the area of the corresponding minor segment. [Use $\pi = 3.14$]

Q49. CBSE 2024 · 3 marks An arc of a circle of radius 10 cm subtends a right angle at the centre of the circle. Find the area of the corresponding major sector. (Use $\pi = 3.14$)

Q50. CBSE 2024 · 3 marks A sector is cut from a circle of radius 21 cm. The central angle of the sector is 150° . Find the length of the arc of this sector and the area of the sector.

Q51. CBSE 2024 · 3 marks To warn ships for underwater rocks, a light house spreads a red coloured light over a sector of angle 80° to a distance of 16.5 km. Find the area of the sea over which the ships are warned. (Use $\pi = 3.14$)

Q52. CBSE 2024 · 3 marks A car has two wipers which do not overlap. Each wiper has a blade of length 21 cm sweeping through an angle of 120° . Find the area cleaned at each sweep of the blades.

Q53. CBSE 2023 · 3 marks A car has two wipers which do not overlap. Each wiper has a blade of length 21 cm sweeping through an angle of 120° . Find the total area cleaned at each sweep of the two blades.

Q54. CBSE 2023 · 3 marks A chord of a circle of radius 14 cm subtends an angle of 60° at the centre. Find the area of the corresponding minor segment of the circle. (Use $\pi = 3.14$ and $\sqrt{3} = 1.73$)

LONG ANSWER (2)

Q55. CBSE 2024 · 5 marks The perimeter of a certain sector of a circle of radius 5.6 m is 20.0 m. Find the area of the sector.

Q56. CBSE 2023 · 5 marks A horse is tied to a peg at one corner of a square shaped grass field of side 15 m by means of a 5 m long rope. Find the area of that part of the field in which the horse can graze. Also, find the increase in grazing area if length of rope is increased to 10 m. (Use $\pi = 3.14$)

CASE-BASED (6)

CASE STUDY · CBSE 2026

In a circular museum hall of radius 14 m, some statues are displayed. Statues are kept inside the inner concentric circle of radius 7 m. One such statue lying in sector OAB, is fenced along line segments OA, AP, PB and BO where P is a point on outer circle.

Q57. CBSE 2026 · 4 marks (i) Find $m\angle AOP$.

CASE STUDY · CBSE 2025

A brooch is a decorative piece often worn on clothing like jackets, blouses or dresses to add elegance. Made from precious metals and decorated with gemstones, brooches come in many shapes and designs. One such brooch is made with silver wire in the form of a circle with diameter 35 mm. The wire is also used in making 5 diameters which divide the circle into 10 equal sectors.

Q58. CBSE 2025 · 4 marks (i) Find the central angle of each sector.

CASE STUDY · CBSE 2024

A stable owner has four horses. He usually tie these horses with 7 m long rope to pegs at each corner of a square shaped grass field of 20 m length, to graze in his farm. But tying with rope sometimes results in injuries to his horses, so he decided to build fence around the area so that each horse can graze.

Q59. CBSE 2024 · 1 mark Find the area of the square shaped grass field.

CASE STUDY · CBSE 2023

Governing council of a local public development authority of Dehradun decided to build an adventurous playground on the top of a hill, which will have adequate space for parking. After survey, it was decided to build rectangular playground, with a semi-circular area allotted for parking at one end of the playground. The length and breadth of the rectangular playground are 14 units and 7 units, respectively. There are two quadrants of radius 2 units on one side for special seats.

Q60. CBSE 2023 · 1 mark What is the total perimeter of the parking area?

Q61. CBSE 2023 · 1 mark Governing council of a local public development authority of Dehradun decided to build an adventurous playground on the top of a hill, which will have adequate space for parking. After survey, it was decided to build rectangular playground, with a semi-circular area allotted for parking at one end of the playground. The length and breadth of the rectangular playground are 14 units and 7 units, respectively. There are two quadrants of radius 2 units on one side for special seats. What is the total perimeter of the parking area?

CASE STUDY · CBSE 2022

John planned a birthday party for his younger sister with his friends. They decided to make some birthday caps by themselves and to buy a cake from a bakery shop. For these two items, they decided the following dimensions: Cake: Cylindrical shape with diameter 24 cm and height 14 cm. Cap: Conical shape with base circumference 44 cm and height 24 cm.

Q62. CBSE 2022 · 2 marks How many square cm paper would be used to make 4 such caps?



12 Surface Areas and Volumes

Notes & MCQs →

MULTIPLE CHOICE AND ASSERTION-REASON (23)

Q1. CBSE 2026 · 1 mark A cone with slant height 10 cm and radius 6 cm is surmounted on a hemisphere of same radius. The height of the toy is:

- (a) 12 cm (b) 16 cm (c) 14 cm (d) 10 cm

Q2. CBSE 2026 · 1 mark A cylinder of radius r is surmounted on a hemisphere of same radius. If total height of the object is 13 cm, then its inner surface area is

- (a) $2\pi r(r + 13)$ (b) $13\pi r$ (c) $2\pi(13 + r)^2$ (d) $26\pi r$

Q3. CBSE 2026 · 1 mark The total surface area of a solid cone of radius 7 cm and slant height 25 cm, is

- (a) 724 cm^2 (b) 704 cm^2 (c) 550 cm^2 (d) 616 cm^2

Q4. CBSE 2026 · 1 mark The number of conical bottles of radius 2 cm and height 1.2 cm that can be filled from a cylindrical bottle of radius 6 cm and height 8 cm, full of liquid, is

- (a) 60 (b) 130 (c) 180 (d) 18

Q5. CBSE 2026 · 1 mark Volumes of two spheres are in the ratio 64 : 27. The ratio of their surface areas is:

- (a) 4 : 3 (b) 3 : 4 (c) 16 : 9 (d) 9 : 16

Q6. CBSE 2026 · 1 mark A conical cavity of maximum volume is carved out from a wooden solid hemisphere of radius 10 cm. Curved surface area of the cavity carved out is (use $\pi = 3.14$)

- (a) $314\sqrt{2} \text{ cm}^2$ (b) 314 cm^2 (c) $3140/3 \text{ cm}^2$
(d) $3140\sqrt{2} \text{ cm}^2$

Q7. CBSE 2026 · 1 mark A camping tent in hemispherical shape of radius 1.4 m, has a door opening of area 0.50 m^2 . Outer surface area of the tent is

- (a) 11.78 m^2 (b) 12.32 m^2 (c) 11.82 m^2 (d) 12.86 m^2

Q8. CBSE 2026 · 1 mark For which of the following solids is the lateral/curved surface area and total surface area the same?

- (a) Cube (b) Cuboid (c) Hemisphere (d) Sphere

Q9. CBSE 2026 · 1 mark A cone and a cylinder have the same base radius and volume. The (height of cone : height of cylinder) is:

- (a) 1 : 1 (b) 3 : 1 (c) 1 : 3 (d) 3 : 2

Q10. CBSE 2026 · 1 mark The total surface area of the entire solid will be:

- (a) $\pi rh + \pi r^2$ (b) $\pi r + \pi r^2$ (c) $\pi r + 2\pi r^2$ (d) $\pi r + 3\pi r^2$

Q11. CBSE 2026 · 1 mark A cone and cylinder have same height and same radius. The volume of the cone and the volume of the cylinder are in the ratio:

- (a) 1 : 1 (b) 1 : 3 (c) 3 : 1 (d) 1 : 2

Q12. CBSE 2025 · 1 mark Assertion (A): If we join two hemispheres of same radius along their bases, then we get a sphere. Reason (R): Total Surface Area of a sphere of radius r is $3\pi r^2$.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q13. CBSE 2025 · 1 mark Assertion (A): If we join two hemispheres of same radius along their bases, then we get a sphere. Reason (R): Total Surface Area of a sphere of radius r is $3\pi r^2$. Select the correct answer from the codes (A), (B), (C) and (D) as given below. (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A). (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A). (C) Assertion (A) is true, but Reason (R) is false. (D) Assertion (A) is false, but Reason (R) is true.

- (a) Both A and R are true, R is the correct explanation
(b) Both A and R are true, R is not the correct explanation
(c) A is true, but R is false (d) A is false, but R is true

Q14. CBSE 2025 · 1 mark If the volumes of two cubes are in the ratio 8 : 125, then the ratio of their surface areas is:

- (a) 8 : 125 (b) 4 : 25 (c) 2 : 5 (d) 16 : 25

Q15. CBSE 2025 · 1 mark A cone and a cylinder have the same base radius and same height. If their volumes are also same, then the height of the cone is:

- (a) r (b) $2r$ (c) $3r$ (d) $4r$

Q16. CBSE 2024 · 1 mark Assertion (A): The area of canvas cloth required to just cover a heap of rice in the form of a cone of diameter 14 m and height 24 m is $175\pi \text{ sq.m}$. Reason (R): The curved surface area of a cone of radius r and slant height l is πrl .

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q17. CBSE 2024 · 1 mark Assertion (A): Two cubes each of edge length 10 cm are joined together. The total surface area of newly formed cuboid is 1200 cm^2 . Reason (R): Area of each surface of a cube of side 10 cm is 100 cm^2 .

- (a) Both Assertion (A) and Reason (R) are true. Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true. Reason (R) does not give correct explanation of (A).
(c) Assertion (A) is true but Reason (R) is not true.
(d) Assertion (A) is not true but Reason (R) is true.



Q18. CBSE 2024 · 1 mark Assertion (A): Two cubes each of edge length 10 cm are joined together. The total surface area of newly formed cuboid is 1200 cm^2 . Reason (R): Area of each surface of a cube of side 10 cm is 100 cm^2 . Select the correct option.

- (a) Both Assertion (A) and Reason (R) are true. Reason (R) is the correct explanation of Assertion (A).
- (b) Both Assertion (A) and Reason (R) are true. Reason (R) does not give correct explanation of (A).
- (c) Assertion (A) is true but Reason (R) is not true.
- (d) Assertion (A) is not true but Reason (R) is true.

Q19. CBSE 2024 · 1 mark The ratio of total surface area of a solid hemisphere to the square of its radius is:

- (a) $2\pi : 1$ (b) $4\pi : 1$ (c) $3\pi : 1$ (d) $1 : 4\pi$

Q20. CBSE 2024 · 1 mark Two identical solid cubes of side 'a' are joined end-to-end. The total surface area of the resulting cuboid is:

- (a) $6a^2$ (b) $10a^2$ (c) $5a^2$ (d) $4a^2$

Q21. CBSE 2024 · 1 mark The total surface area of a solid hemisphere of radius 7 cm is:

- (a) $98\pi \text{ cm}^2$ (b) $147\pi \text{ cm}^2$ (c) $196\pi \text{ cm}^2$ (d) $228(3/2)\pi \text{ cm}^2$

Q22. CBSE 2023 · 1 mark If the area of the base of a cone is 51 cm^2 and its volume is 85 cm^3 , then the vertical height of the cone is given as :

- (a) 65 cm (b) 35 cm (c) 25 cm (d) 5 cm

Q23. CBSE 2023 · 1 mark Water in a river which is 3 m deep and 40 m wide is flowing at the rate of 2 km/h. How much water will fall into the sea in 2 minutes?

- (a) 800 m^3 (b) 4000 m^3 (c) 8000 m^3 (d) 2000 m^3

VERY SHORT ANSWER (2)

Q24. CBSE 2022 · 2 marks A cone of height 28 cm and radius of base 7 cm is made up of modelling clay. A child reshapes it in the form of a sphere. Find the radius of the sphere.

Q25. CBSE 2022 · 2 marks A solid hemisphere of radius 8 cm is melted and recast into 4 identical right circular solid cones of base radius 4 cm. Find the height of the cone.

SHORT ANSWER (6)

Q26. CBSE 2025 · 3 marks A room is in the form of a cylinder surmounted by a hemispherical dome. The base radius of the hemisphere is half of the height of the cylindrical part. If the room contains m^3 of air, find the height of the cylindrical part. (Use $\pi = 22/7$).

Q27. CBSE 2025 · 3 marks If the radii of the bases of a cylinder and a cone are in the ratio 3 : 4 and their heights are in the ratio 2 : 3, find the ratio of their volumes.

Q28. CBSE 2025 · 3 marks A room is in the form of a cylinder surmounted by a hemispherical dome. The base radius of the hemisphere is half of the height of the cylindrical part. If the room contains m^3 of air, find the height of the cylindrical part. (Use $\pi = 22/7$)

Q29. CBSE 2022 · 2 marks A solid metallic sphere of radius 10.5 cm is melted and recast into a number of smaller cones, each of radius 3.5 cm and height 3 cm. Find the number of cones so formed.

Q30. CBSE 2022 · 2 marks 150 spherical marbles, each of diameter 1.4 cm, are dropped in a cylindrical vessel of diameter 7 cm containing some water, and are completely immersed in water. Find the rise in the level of water in the cylindrical vessel.

Q31. CBSE 2022 · 2 marks A solid metallic sphere of radius 3 cm is melted and recast into the shape of a solid cylinder of radius 2 cm. Find the height of the cylinder.

LONG ANSWER (19)

Q32. CBSE 2026 · 5 marks From a solid cylinder whose height is 2.8 cm and radius 2.1 cm, a conical cavity of the same height and same radius is hollowed out. Find the volume and the total surface area of the remaining solid.

Q33. CBSE 2026 · 5 marks (a) A toy is in the form of a cone surmounted on a hemisphere. The cone and hemisphere have the same radii. The height of the conical part of the toy is equal to the diameter of its base. If the radius of the conical part is 5 cm, find the volume of the toy. OR (b) A cubical block is surmounted by a hemisphere of radius 3.5 cm. What is the smallest possible length of the edge of the cube so that the hemisphere can totally lie on the cube? Find the total surface area of the solid so formed.

Q34. CBSE 2026 · 5 marks A toy is in the form of a cone surmounted on a hemisphere. The cone and hemisphere have the same radii. The height of the conical part of the toy is equal to the diameter of its base. If the radius of the conical part is 5 cm, find the volume of the toy.

Q35. CBSE 2026 · 5 marks A hemispherical depression is scooped out from the top face of a wooden cubical block of side 14 cm. If the diameter of the hemisphere is equal to the side of the cube, find the total surface area of the remaining solid block. (Use $\pi = 22/7$)

Q36. CBSE 2026 · 5 marks A spherical glass vessel has a cylindrical neck which is 7 cm long and 2 cm in diameter. The diameter of the spherical part is 14 cm. Find the capacity of the entire glass vessel. (Use $\pi = 22/7$)

Q37. CBSE 2026 · 5 marks A perfume bottle is in the form of a cylinder but the bottom of the bottle has a hemispherical raised portion to reduce the capacity of the bottle. The inner diameter of the bottle is 5 cm and the height of the bottle is 10 cm. Find the capacity of the perfume bottle in mL. (Use $\pi = 3.14$ and $1 \text{ cm}^3 = 1 \text{ mL}$)

Q38. CBSE 2026 · 5 marks From a solid wooden cylinder of height 10 cm and radius 14 cm, a cylinder of radius 7 cm and height 5 cm is scooped out to form a cavity inside the solid cylinder. Find the total surface area of the remaining solid.

Q39. CBSE 2026 · 5 marks A necklace is made up of wooden beads. Each bead is in the form of a sphere of diameter 4.2 mm. A cylinder is hollowed out from each bead. If the radius of the cylinder is 1 mm, find the volume of wood left in each bead.



Q40. CBSE 2025 · 5 marks A vessel is in the form of an inverted cone. Its height is 8 cm and the radius of its top, which is open, is 5 cm. It is filled with water up to the brim. When lead shots, each of which is a sphere of radius 0.5 cm, are dropped into the vessel, one-fourth of the water flows out. Find the number of lead shots dropped in the vessel.

Q41. CBSE 2025 · 5 marks A solid toy is in the form of a hemisphere surmounted by a right circular cone. The height of the cone is 2 cm and the diameter of the base is 4 cm. Determine the volume of the toy. Also, find the surface area of the toy. (Take $\pi = 3.14$)

Q42. CBSE 2024 · 5 marks The interior of a building is in the form of a cylinder of base radius 12 m and height 3.5 m surmounted by a cone of equal base and slant height 14 m. Find the internal curved surface area of the building.

Q43. CBSE 2024 · 5 marks A solid iron pole consists of a solid cylinder of height 200 cm and base diameter 28 cm, which is surmounted by another cylinder of height 50 cm and radius 7 cm. Find the mass of the pole, given that 1 cm^3 of iron has approximately 8 g mass.

Q44. CBSE 2024 · 5 marks A tent is in the shape of a cylinder, surmounted by a conical top. If the height and diameter of the cylindrical part are 3.5 m and 6 m, and slant height of the top is 4.2 m, find the area of canvas used for making the tent. Also, find the cost of canvas of the tent at the rate of ₹500 per m^2 .

Q45. CBSE 2024 · 5 marks (a) A textile industry runs in a shed. This shed is in the shape of a cuboid surmounted by a half cylinder. If the base of the industry is of dimensions $14 \text{ m} \times 20 \text{ m}$ and the height of the cuboidal portion is 7 m, find the volume of air that the industry can hold. Further, suppose the machinery in the industry occupies a total space of 400 m^3 . Then, how much space is left in the industry?

Q46. CBSE 2023 · 5 marks A student was asked to make a model shaped like a cylinder with two cones attached to its ends by using a thin aluminium sheet. The diameter of the model is 3 cm and its total length is 12 cm. If each cone has a height of 2 cm, find the volume of air contained in the model.

Q47. CBSE 2023 · 5 marks From a solid cylinder of height 20 cm and diameter 12 cm, a conical cavity of height 8 cm and radius 6 cm is hallowed out. Find the total surface area of the remaining solid.

Q48. CBSE 2023 · 5 marks A wooden article was made by scooping out a hemisphere from each end of a solid cylinder. If the height of the cylinder is 10 cm and its base is of radius 3.5 cm, find the total surface area of the article.

Q49. CBSE 2022 · 4 marks From a solid cylinder of height 30 cm and radius 7 cm, a conical cavity of height 24 cm and same radius is hollowed out. Find the total surface area of the remaining solid.

Q50. CBSE 2022 · 4 marks A spherical glass vessel has a cylindrical neck 8 cm long and 1 cm in radius. The radius of the spherical part is 9 cm. Find the amount of water (in litres) it can hold, when filled completely.

CASE-BASED (11)

CASE STUDY · CBSE 2026

'Gilli Danda' is a very popular traditional game of India which is played with two wooden sticks – the larger one is called 'Danda' and smaller one 'Gilli'. 'Danda' – It is cylindrical in shape with diameter 4 cm and length 42 cm. Gilli – It is cylindrical in middle with identical conical ends of same radius 1.5 cm and length 2.8 cm. The length of cylindrical part is 7 cm.

Q51. CBSE 2026 · 1 mark Find the volume of wood used in making both the conical parts of Gilli.

CASE STUDY · CBSE 2026

There are many varieties of mushrooms available in the world. One such mushroom 'Amanita muscaria' has a upper part which is like red cap (hemispherical) and lower part is like white stem (cylindrical). The hemispherical cap's radius = 3 cm and cylindrical stem is 2 cm high with diameter 1.4 cm. Considering mushroom a solid object.

Q52. CBSE 2026 · 1 mark What is the total height of a mushroom?

CASE STUDY · CBSE 2026

In a coffee shop, coffee is served in two types of cups. One is cylindrical shape with each of diameter 8 cm and height 7 cm and the other hemispherical with each of diameter 14 cm.

Q53. CBSE 2026 · 4 marks What is the outer curved surface area of the cylindrical cup?

CASE STUDY · CBSE 2025

A skilled carpenter decided to craft a special rolling pin for the local baker. He carefully joined three cylindrical pieces of wood — two small ones on the ends and one larger in the centre to create a perfect tool. The baker loved the rolling pin, as it rolled out the smoothest dough for breads and pastries. The length of the bigger cylindrical part is 12 cm and diameter is 7 cm and the length of each smaller cylindrical part is 5 cm and diameter is 2.1 cm.

Q54. CBSE 2025 · 1 mark Find the volume of the bigger cylindrical part.

CASE STUDY · CBSE 2025

A garden designer is planning a rectangular lawn that is to be surrounded by a uniform walkway. The total area of the lawn and the walkway is 360 square metres. The width of the walkway is same on all sides. The dimensions of the lawn itself are 12 metres by 10 metres.

Q55. CBSE 2025 · 2 marks (ii)(b) If the cost of paving the walkway at the rate of ₹50 per square metre is ₹12,000, calculate the area of the walkway.

CASE STUDY · CBSE 2024



A circus tent is cylindrical upto a height of 8 m and conical above it. The diameter of the base is 28 m and total height of tent is 18.5 m.

Q56. CBSE 2024 · 1 mark Find slant height of the conical part.

CASE STUDY · CBSE 2024

The word 'circus' has the same root as 'circle'. In a closed circular area, various entertainment acts including human skill and animal training are presented before the crowd. A circus tent is cylindrical upto a height of 8 m and conical above it. The diameter of the base is 28 m and total height of tent is 18.5 m.

Q57. CBSE 2024 · 1 mark A circus tent is cylindrical upto a height of 8 m and conical above it. The diameter of the base is 28 m and total height of tent is 18.5 m. Find slant height of the conical part.

CASE STUDY · CBSE 2024

Tamper-proof tetra-packed milk guarantees both freshness and security. This milk ensures uncompromised quality, preserving the nutritional values within and making it a reliable choice for health-conscious individuals. 500 mL milk is packed in a cuboidal container of dimensions 15 cm × 8 cm × 5 cm. These milk packets are then packed in cuboidal cartons of dimensions 30 cm × 32 cm × 15 cm.

Q58. CBSE 2024 · 4 marks (i) Find the volume of the cuboidal carton.

CASE STUDY · CBSE 2023

In a coffee shop, coffee is served in two types of cups. One is cylindrical in shape with diameter 7 cm and height 14 cm and the other is hemispherical with diameter 21 cm.

Q59. CBSE 2023 · 1 mark Find the area of the base of the cylindrical cup.

CASE STUDY · CBSE 2022

John planned a birthday party for his younger sister with his friends. They decided to make some birthday caps by themselves and to buy a cake from a bakery shop. For these two items, they decided the following dimensions: Cake: Cylindrical shape with diameter 24 cm and height 14 cm. Cap: Conical shape with base circumference 44 cm and height 24 cm.

Q60. CBSE 2022 · 2 marks The bakery shop sells cakes by weight (0.5 kg, 1 kg, 1.5 kg, etc.). To have the required dimensions, how much cake should they order, if 650 cm^3 equals 100 g of cake?

Q61. CBSE 2022 · 2 marks How many square cm paper would be used to make 4 such caps? Cap: Conical shape with base circumference 44 cm and height 24 cm.

13 Statistics

Notes & MCQs →

MULTIPLE CHOICE AND ASSERTION-REASON (32)

Q1. CBSE 2026 · 1 mark While calculating mean of a grouped frequency distribution using step deviation method $\bar{x} = a + (h/f)\sum fu$ it was found that $\bar{x} = 62$, $a = 47.5$, $h = 5$. The value of $\bar{u}$ is:

- (a) 3 (b) 14.5 (c) 2.9 (d) 3.1

Q2. CBSE 2026 · 1 mark While calculating mean of a grouped frequency distribution using step deviation method $\bar{x} = a + (h/\sum f) \times \sum(u \times f)$, it was found that $\bar{x} = 62$, $a = 47.5$, $h = 5$. The value of $\bar{u}$ is:

- (a) 3 (b) 14.5 (c) 2.9 (d) 3.1

Q3. CBSE 2026 · 1 mark While calculating mean of a grouped frequency distribution using step deviation method $\bar{x} = a + (h/n)\sum fu$, it was found that $\bar{x} = 62$, $a = 47.5$, $h = 5$. The value of $\bar{u}$ is:

- (a) 3 (b) 14.5 (c) 2.9 (d) 3.1

Q4. CBSE 2026 · 1 mark Assertion (A): Median of a data is the value of $N/2$, where N represents sum of all frequencies. Reason (R): Median divides the whole distribution in two equal parts.

- (a) Both, Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A)
(b) Both, Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A)
(c) Assertion (A) is true, but Reason (R) is false
(d) Assertion (A) is false, but Reason (R) is true

Q5. CBSE 2026 · 1 mark If the mean of first n natural numbers is $6n/11$, then n is

- (a) 11 (b) 6 (c) 12 (d) 22

Q6. CBSE 2026 · 1 mark Assertion (A): If the Mode and Mean of a data are 12k and 15k, then Median of the data is 14k. Reason (R): The relation between the Mean, Mode and Median of a data is: $\text{Mean} = 3 \text{ Median} - 2 \text{ Mode}$.

- (a) Both, Assertion (A) and Reason (R) are true and Reason (R) is correct explanation of Assertion (A).
(b) Both, Assertion (A) and Reason (R) are true, but Reason (R) is not correct explanation for Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.



Q7. CBSE 2026 · 1 mark Assertion (A): If the value of mode and mean for a distribution is 50 and 56 respectively, then the value of median is 54. Reason (R): Median = $\frac{1}{3}$ (Mode – 2 Mean)

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
 (b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not correct explanation of Assertion (A).
 (c) Assertion (A) is true, but Reason (R) is false.
 (d) Assertion (A) is false, but Reason (R) is true.

Q8. CBSE 2026 · 1 mark While calculating mean of a grouped frequency distribution, step deviation method was used where $(x - a)/h = u$. It was found that $\bar{x} = 64$, $h = 5$ and $a = 62.5$. The value of $\bar{u}$ is

- (a) 0.5 (b) 1.5 (c) 0.3 (d) 7.5

Q9. CBSE 2026 · 1 mark The class mark of the median class of the following data is: Class Interval: 10-25, 25-40, 40-55, 55-70, 70-85, 85-100; Frequency: 2, 3, 7, 6, 6, 6

- (a) 40 (b) 55 (c) 47.5 (d) 62.5

Q10. CBSE 2026 · 1 mark The following distribution shows the number of runs scored by some batsmen in test matches: Runs Scored: 3000-4000, 4000-5000, 5000-6000, 6000-7000; Number of Batsmen: 5, 10, 9, 8. The lower limit of the modal class is:

- (a) 3000 (b) 4000 (c) 5000 (d) 6000

Q11. CBSE 2026 · 1 mark In the formula of mode given by mode = $l + \frac{(f - f_1)}{(2f - f_1 - f_2)} \times h$, f_1 denotes the:

- (a) frequency of the modal class
 (b) frequency of class preceding modal class
 (c) frequency of class succeeding modal class
 (d) cumulative frequency of modal class

Q12. CBSE 2026 · 1 mark For a distribution, if mean = median = a , then its mode is:

- (a) $3a$ (b) $2a$ (c) a (d) 0

Q13. CBSE 2026 · 1 mark For a distribution, if mean = 15 and mode = 12, then its median is:

- (a) 12 (b) 13 (c) 14 (d) 15

Q14. CBSE 2025 · 1 mark Mode and Mean of a data are $15x$ and $18x$, respectively. Then the median of the data is:

- (a) x (b) $11x$ (c) $17x$ (d) $34x$

Q15. CBSE 2025 · 1 mark What is the mode of a data if median and mean of the same data are 9.6 and 10.5, respectively?

- (a) 7.8 (b) 12.3 (c) 8.4 (d) 7

Q16. CBSE 2025 · 1 mark If the mean of 2, 9, $x+6$, $2x+3$, 5, 10, 5 is 7, then the value of x is:

- (a) 9 (b) 6 (c) 5 (d) 3

Q17. CBSE 2025 · 1 mark The mean of seven observations is 17. If the mean of the first four observations is 15 and that of the last four observations is 18, then the fourth observation is:

- (a) 14 (b) 13 (c) 12 (d) 10

Q18. CBSE 2024 · 1 mark For the above distribution, the modal class is: Marks: Below 10, Below 20, Below 30, Below 40, Below 50; Number of Students: 3, 12, 27, 57, 75

- (a) 10-20 (b) 20-30 (c) 30-40 (d) 40-50

Q19. CBSE 2024 · 1 mark If value of each observation in a data is increased by 2, then median of the new data

- (a) increases by 2 (b) increases by $2n$ (c) remains same
 (d) decreases by 2

Q20. CBSE 2024 · 1 mark After an examination, a teacher wants to know the marks obtained by maximum number of the students in her class. She requires to calculate ____ of marks.

- (a) median (b) mode (c) mean (d) range

Q21. CBSE 2024 · 1 mark The mean of five observations is 15. If the mean of first three observations is 14 and that of the last three observations is 17, then the third observation is

- (a) 20 (b) 19 (c) 18 (d) 17

Q22. CBSE 2024 · 1 mark The mean of five numbers is 15. If we include one more number, the mean of six numbers becomes 17. The included number is:

- (a) 27 (b) 37 (c) 17 (d) 25

Q23. CBSE 2024 · 1 mark If the difference of mode and median of a data is 24, then the difference of its median and mean is:

- (a) 12 (b) 24 (c) 8 (d) 36

Q24. CBSE 2024 · 1 mark If the mean of 6, 7, p , 8, q , 14 is 9, then:

- (a) $p - q = 19$ (b) $p + q = 19$ (c) $p - q = 21$
 (d) $p + q = 21$

Q25. CBSE 2024 · 1 mark For the data 2, 9, $x + 6$, $2x + 3$, 5, 10, 5; if the mean is 7, then the value of x is:

- (a) 9 (b) 6 (c) 5 (d) 3

Q26. CBSE 2024 · 1 mark If the mean and mode of a data are 24 and 12 respectively, then its median is:

- (a) 25 (b) 18 (c) 20 (d) 22

Q27. CBSE 2023 · 1 mark The empirical relation between the mode, median and mean of a distribution is:

- (a) Mode = 3 Median – 2 Mean
 (b) Mode = 3 Mean – 2 Median
 (c) Mode = 2 Median – 3 Mean
 (d) Mode = 2 Mean – 3 Median

Q28. CBSE 2023 · 1 mark For the following distribution: Class: 0-5, 5-10, 10-15, 15-20, 20-25 Frequency: 10, 15, 12, 20, 9 The sum of lower limits of median class and modal class is:

- (a) 15 (b) 25 (c) 30 (d) 35

Q29. CBSE 2023 · 1 mark For the following distribution: Marks Below 10 20 30 40 50 60, Number of Students 3 12 27 57 75 80. The modal class is:

- (a) 10-20 (b) 20-30 (c) 30-40 (d) 50-60

Q30. CBSE 2023 · 1 mark If the mean and the median of a data are 12 and 15 respectively, then its mode is:

- (a) 13.5 (b) 21 (c) 6 (d) 14



Q31. CBSE 2023 · 1 mark If every term of the statistical data consisting of n terms is decreased by 2, then the mean of the data :

- (a) decreases by 2 (b) remains unchanged
(c) decreases by $2n$ (d) decreases by 1

Q32. CBSE 2023 · 1 mark If the mean and the mode of a distribution are 15 and 18 respectively, then the median of the distribution is :

- (a) 17 (b) 15 (c) 16 (d) 18

SHORT ANSWER (18)

Q33. CBSE 2026 · 3 marks Find the mean of the following distribution: Class 30–40 40–50 50–60 60–70 70–80; Frequency 6 13 8 12 11

Q34. CBSE 2024 · 3 marks Calculate the mean of the following data: Class: 4–6, 7–9, 10–12, 13–15; Frequency: 5, 4, 9, 10

Q35. CBSE 2024 · 3 marks In a test, the marks obtained by 100 students (out of 50) are given below: Marks obtained: 0–10, 10–20, 20–30, 30–40, 40–50 Number of students: 12, 23, 34, 25, 6 Find the mean marks of the students.

Q36. CBSE 2023 · 3 marks Find the mean of the following frequency distribution: Classes: 25–30, 30–35, 35–40, 40–45, 45–50, 50–55, 55–60; Frequency: 14, 22, 16, 6, 5, 3, 4

Q37. CBSE 2023 · 3 marks Find the mean of the following distribution: Classes: 0–15, 15–30, 30–45, 45–60, 60–75, 75–90 with Frequencies: 17, 20, 18, 21, 15, 9

Q38. CBSE 2022 · 2 marks Find the mode of the following frequency distribution: Class: 10–20, 20–30, 30–40, 40–50, 50–60 Frequency: 15, 10, 12, 17, 4

Q39. CBSE 2022 · 3 marks For what value of x , is the median of the following frequency distribution 34.5? Class: 0–10, 10–20, 20–30, 30–40, 40–50, 50–60, 60–70 Frequency: 3, 5, 11, 10, x , 3, 2

Q40. CBSE 2022 · 3 marks Following is the daily expenditure on lunch by 30 employees of a company: Daily Expenditure (in Rupees): 100–120, 120–140, 140–160, 160–180, 180–200 Number of Employees: 8, 3, 8, 6, 5 Find the mean daily expenditure of the employees.

Q41. CBSE 2022 · 3 marks If the median of the following data is 33, then find the value of m : Class: 0–15, 15–30, 30–45, 45–60, 60–75, 75–90 Frequency: 17, 35, 40, 18, m , 2

Q42. CBSE 2022 · 2 marks Find the mode of the given frequency distribution: Class: 15–25, Frequency: 6 Class: 25–35, Frequency: 11 Class: 35–45, Frequency: 22 Class: 45–55, Frequency: 23 Class: 55–65, Frequency: 14 Class: 65–75, Frequency: 5

Q43. CBSE 2022 · 3 marks The weights (in kg) of 50 wild animals of a National Park were recorded and the following data was obtained: Weight (in kg): 100–110, Number of animals: 4 Weight (in kg): 110–120, Number of animals: 12 Weight (in kg): 120–130, Number of animals: 23 Weight (in kg): 130–140, Number of animals: 8 Weight (in kg): 140–150, Number of animals: 3 Find the mean weight (in kg) of animals, using assumed mean method.

Q44. CBSE 2022 · 3 marks For the following frequency distribution, find the median: Class: 1400–1550, Frequency: 6 Class: 1550–1700, Frequency: 13 Class: 1700–1850, Frequency: 25 Class: 1850–2000, Frequency: 10

Q45. CBSE 2022 · 3 marks The percentage of marks obtained by 100 students in an examination are given below: Percentage of Marks: 30–35, Number of Students: 16 Percentage of Marks: 35–40, Number of Students: 14 Percentage of Marks: 40–45, Number of Students: 18 Percentage of Marks: 45–50, Number of Students: 20 Percentage of Marks: 50–55, Number of Students: 18 Percentage of Marks: 55–60, Number of Students: 12 Percentage of Marks: 60–65, Number of Students: 2 Determine the median percentage of marks.

Q46. CBSE 2022 · 3 marks Find the mean of the following frequency distribution: Class: 0–10, Frequency: 12 Class: 10–20, Frequency: 18 Class: 20–30, Frequency: 27 Class: 30–40, Frequency: 20 Class: 40–50, Frequency: 17 Class: 50–60, Frequency: 6

Q47. CBSE 2022 · 2 marks Find the mode of the following frequency distribution: Class: 0–20, 20–40, 40–60, 60–80, 80–100; Frequency: 8, 7, 12, 5, 3

Q48. CBSE 2022 · 3 marks Determine the median marks for the following data: Marks: 0–10, 10–20, 20–30, 30–40, 40–50; Number of Students: 3, 8, 15, 10, 8

Q49. CBSE 2022 · 2 marks Find mode of the following frequency distribution: Class: 100–110, 110–120, 120–130, 130–140, 140–150 Frequency: 5, 9, 8, 11, 7

Q50. CBSE 2022 · 3 marks Determine median of the following frequency distribution: Class: 15–20, 20–25, 25–30, 30–35, 35–40, 40–45 Frequency: 8, 13, 21, 12, 5, 4

LONG ANSWER (18)

Q51. CBSE 2026 · 5 marks Find mean and mode of the following data: Class 10–20 20–30 30–40 40–50 50–60 60–70 70–80, Frequency 5 4 10 13 12 10 6

Q52. CBSE 2026 · 5 marks Find mean and mode of the following data: Class 0–15, 15–30, 30–45, 45–60, 60–75, 75–90, 90–105 with Frequency 4, 6, 8, 10, 12, 7, 3

Q53. CBSE 2026 · 5 marks Find the missing frequencies p and q in the following frequency distribution, when sum of frequencies is 40 and mean is 19: Class 0–5: 2, 5–10: 5, 10–15: 6, 15–20: p , 20–25: 10, 25–30: q , 30–35: 4

Q54. CBSE 2026 · 5 marks Find the mean and the mode for the following frequency distribution: Class: 30–35, 35–40, 40–45, 45–50, 50–55; Frequency: 3, 9, 7, 3, 2

Q55. CBSE 2026 · 5 marks The mean of the following frequency distribution is 28. If sum of all frequencies is 100, then find the values of p and q : Class Interval: 0–10, 10–20, 20–30, 30–40, 40–50, 50–60; Frequency: 12, p , 27, 20, q , 6

Q56. CBSE 2026 · 5 marks The following data gives the information on the observed lifetime (in hours) of 200 electrical components: Lifetime (in hours): 0–20, 20–40, 40–60, 60–80, 80–100, 100–120; Number of electrical components: 10, 35, 50, 60, 30, 15. Find the mean lifetime (in hours) of the electrical components.



Q57. CBSE 2026 · 5 marks The following frequency distribution gives the monthly consumption of electricity of 68 consumers of a locality. Find the monthly mean consumption from the data. Monthly Consumption (in units): 50–100, 100–150, 150–200, 200–250, 250–300, 300–350, 350–400 Number of Consumers: 4, 5, 13, 20, 14, 8, 4

Q58. CBSE 2026 · 5 marks A life insurance agent found the following data for the distribution of 100 policy holders on the basis of their ages. Age (in years) 15–20, 20–25, 25–30, 30–35, 35–40, 40–45, 45–50, 50–55, 55–60; Number of policy holders 2, 4, 18, 21, 33, 11, 3, 6, 2. Find the median age of the policy holders.

Q59. CBSE 2026 · 5 marks (a) The lengths of 40 leaves of a plant are measured, correct to the nearest millimetre and data obtained is represented in the following table: Length in (mm) | 100–120 | 120–140 | 140–160 | 160–180 | 180–200; Number of leaves | 8 | 9 | 12 | 5 | 6. Find the median length (in mm) of the leaves. OR (b) A class teacher has the following absentees record of 30 students of a class. Number of days | 0–4 | 4–8 | 8–12 | 12–16 | 16–20 | 20–24; Number of Absent students | 1 | 8 | x | 6 | 5 | y. If the mean number of days a student was absent is 12, find the values of x and y.

Q60. CBSE 2026 · 5 marks The weights of 30 students of a class are given in the following distribution table: Weight (in kg): 40–45, 45–50, 50–55, 55–60, 60–65, 65–70. Number of students: 2, 5, 8, 6, 3. Find the median weight of the students.

Q61. CBSE 2026 · 5 marks The following distribution shows the weekly pocket allowance (in ₹) of some children of a locality. The mean pocket allowance is ₹180. Weekly Pocket Allowance (in ₹): 110–130 (7), 130–150 (6), 150–170 (9), 170–190 (13), 190–210 (f), 210–230 (5), 230–250 (4). Find the value of f. Hence find the mode of given data.

Q62. CBSE 2025 · 5 marks The following frequency distribution gives the monthly consumption of electricity of 68 consumers of a locality. Find the mean and mode of the data: Monthly Consumption (in units): 65–85 (4), 85–105 (5), 105–125 (13), 125–145 (20), 145–165 (14), 165–185 (8), 185–205 (4)

Q63. CBSE 2025 · 5 marks Find the Mean and Mode of the following frequency distribution: Class: 0–10, 10–20, 20–30, 30–40, 40–50, 50–60, 60–70 Frequency: 8, 7, 15, 20, 12, 8, 10

Q64. CBSE 2025 · 5 marks Find the mean and median for the following data: Classes: 5–15, 15–25, 25–35, 35–45, 45–55, 55–65, 65–75 Frequency: 2, 3, 5, 7, 4, 2, 2

Q65. CBSE 2025 · 5 marks Find the Mean and Mode of the following data: Class: 4–8, 8–12, 12–16, 16–20, 20–24, 24–28, 28–32, 32–36; Frequency: 2, 12, 15, 25, 18, 12, 13, 3

Q66. CBSE 2024 · 5 marks The following distribution shows the daily pocket allowance of children of a locality. The mean daily pocket allowance is ₹36.10. Find the missing frequency, f. Daily pocket allowance (in ₹): 20–25, 25–30, 30–35, 35–40, 40–45, 45–50, 50–55. Number of children: 7, 6, 9, 13, f, 5, 4.

Q67. CBSE 2023 · 5 marks The mode of the following frequency distribution is 55. Find the missing frequencies. Class Interval: 0–15, 15–30, 30–45, 45–60, 60–75, 75–90 Frequency: 6, 7, a, 15, 10, b Total Frequency: 51

Q68. CBSE 2023 · 5 marks The monthly expenditure on milk in 200 families of a Housing Society is given below: Monthly Expenditure (in ₹): 1000–1500, 1500–2000, 2000–2500, 2500–3000, 3000–3500, 3500–4000, 4000–4500, 4500–5000 Number of families: 24, 40, 33, x, 30, 22, 16, 7 Find the value of x and also, find the median and mean expenditure on milk.

CASE-BASED (6)

CASE STUDY · CBSE 2026

The Air Quality Index (AQI) is a scale from 0 to 500 that indicates air quality, with higher numbers signifying more pollution and greater health concerns. Mansi collected the daily data of AQI of her city for a month and presented it as given below: AQI Range: 1 – 100, 101 – 200, 201 – 300, 301 – 400, 401 – 500. Number of Days: 3, 9, 12, 4, 2

Q69. CBSE 2026 · 1 mark Convert the data to continuous frequency distribution.

CASE STUDY · CBSE 2024

Student-teacher ratio expresses the relationship between the number of students enrolled in a school and the number of teachers employed by the school. This ratio is important for a number of reasons. It can be used as a tool to measure teachers' workload as well as the allocation of resources. A survey was conducted in 100 secondary schools of a state and the following frequency distribution table was prepared: Number of students per Teacher: 20–25, 25–30, 30–35, 35–40, 40–45, 45–50; Number of Schools: 5, 15, 25, 30, 15, 10

Q70. CBSE 2024 · 4 marks (i) What is the lower limit of the median class?

CASE STUDY · CBSE 2024

Activities like running or cycling reduce stress and the risk of mental disorders like depression. Running helps build endurance. Children develop stronger bones and muscles and are less prone to gain weight. The physical education teacher of a school has decided to conduct an inter school running tournament in his school premises. The time taken by a group of students to run 100 m, was noted as follows: Time (in seconds): 0–20, 20–40, 40–60, 60–80, 80–100; Number of students: 8, 10, 13, 6, 3

Q71. CBSE 2024 · 1 mark What is the median class of the above given data?

Q72. CBSE 2024 · 4 marks (i) What is the median class of the above given data? (ii) (a) Find the mean time taken by the students to finish the race. OR (b) Find the mode of the above given data. (iii) How many students took time less than 60 seconds?

CASE STUDY · CBSE 2024



Activities like running or cycling reduce stress and the risk of mental disorder like depression. Running helps build endurance. Children develop stronger bones and muscles and are less prone to gain weight. The physical education teacher of a school has decided to conduct an inter school running tournament in his school premises. The time taken by a group of students to run 100 m, was noted as follows: Time (in seconds): 0-20, 20-40, 40-60, 60-80, 80-100. Number of students: 8, 10, 13, 6, 3.

Q73. CBSE 2024 · 1 mark What is the median class of the above given data?

Heart Rate: The heart rate is one of the 'vital signs' of health in the human body. It measures the number of times per minute that the heart contracts or beats. While a normal heart rate does not guarantee that a person is free of health problems, it is a useful benchmark for identifying a range of health issues. Thirty women were examined by doctors of AIIMS and the number of heart beats per minute were recorded and summarized as follows: Number of heart beats per minute 65-68: 2 women; 68-71: 4 women; 71-74: 3 women; 74-77: 8 women; 77-80: 7 women; 80-83: 4 women; 83-86: 2 women.

Q74. CBSE 2024 · 4 marks (i) How many women are having heart beat in the range 68 – 77?

CASE STUDY · CBSE 2024

14 Probability

Notes & MCQs →

MULTIPLE CHOICE AND ASSERTION-REASON (61)

Q1. CBSE 2026 · 1 mark Probability of getting an irrational number at random from the numbers 3, 4, $\sqrt[3]{9}$, $\sqrt[3]{8}$, $\sqrt{5}$, 0, $42/3$ is:

- (a) 0 (b) $4/7$ (c) $3/7$ (d) 1

Q2. CBSE 2026 · 1 mark A card is drawn from a well shuffled deck of 52 cards. The probability of getting an ace or a ten is:

- (a) $1/13$ (b) $2/13$ (c) $1/26$ (d) $4/13$

Q3. CBSE 2026 · 1 mark Assertion (A): The probability of an event can not be $1/0.9$. Reason (R): $0 \leq P(E) \leq 1$ for an event E.

- (a) Both, Assertion (A) and Reason (R) are true and Reason (R) is correct explanation of Assertion (A)
(b) Both, Assertion (A) and Reason (R) are true, but Reason (R) is not correct explanation for Assertion (A)
(c) Assertion (A) is true, but Reason (R) is false
(d) Assertion (A) is false, but Reason (R) is true

Q4. CBSE 2026 · 1 mark A card is drawn from a well shuffled deck of 52 cards. The probability that it is not a diamond card is:

- (a) $1/4$ (b) 0 (c) $1/2$ (d) $3/4$

Q5. CBSE 2026 · 1 mark The probability of getting sum greater than 10, when two dice are rolled together, is

- (a) $1/9$ (b) $1/18$ (c) $1/12$ (d) 1

Q6. CBSE 2026 · 1 mark A bag contains some red and some white balls. A ball is drawn at random from the bag. If the probability of getting a red ball is $2/7$, then the probability of getting a white ball is

- (a) $1/14$ (b) $5/7$ (c) $1/7$ (d) $2/7$

Q7. CBSE 2026 · 1 mark A card is drawn from a well-shuffled deck of 52 playing cards. The probability of getting a queen of spade is

- (a) $1/26$ (b) $1/52$ (c) 0 (d) $1/4$

Q8. CBSE 2026 · 1 mark Three coins are tossed together. The probability of getting exactly two tails is

- (a) $2/8$ (b) $1/2$ (c) $3/8$ (d) 1

Q9. CBSE 2026 · 1 mark One ticket is drawn at random from a bag containing 50 tickets numbered 1 to 50. The probability that the drawn ticket has a number which is a multiple of 7 is :

- (a) $1/5$ (b) $7/50$ (c) $3/25$ (d) $4/25$

Q10. CBSE 2026 · 1 mark Two dice are thrown simultaneously. The probability of getting a sum of 7 is :

- (a) $2/9$ (b) $1/9$ (c) $5/36$ (d) $1/6$

Q11. CBSE 2026 · 1 mark A card is drawn from a packet of 50 identical cards numbered from 1 to 50. The probability of drawing a number which is a perfect square, is:

- (a) $7/50$ (b) $8/50$ (c) $6/50$ (d) $10/50$

Q12. CBSE 2026 · 1 mark The probability of getting a sum of 7, when two dice are thrown simultaneously, is:

- (a) $1/9$ (b) $1/12$ (c) $1/6$ (d) $5/36$

Q13. CBSE 2026 · 1 mark Assertion (A): The probability that the date of birth of a man is in the month of June is $1/12$. Reason (R): There are 12 months in a year.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q14. CBSE 2026 · 1 mark Which of the following can not be the probability of an event?

- (a) $39/100$ (b) $0.001/20$ (c) $10/0.2$ (d) 10%

Q15. CBSE 2026 · 1 mark A card is drawn at random from a well shuffled deck of 52 playing cards. The probability that it is either a ten or a king is

- (a) $1/26$ (b) $2/13$ (c) $1/13$ (d) $8/26$

Q16. CBSE 2026 · 1 mark In a random experiment of throwing a die, which of the following is a sure event?

- (a) Getting a number between 1 and 6
(b) Getting an odd number < 7
(c) Getting an even number < 7
(d) Getting a natural number < 7



Q17. CBSE 2026 · 1 mark A bag contains 3 red, 4 white and 7 green balls. A ball is drawn at random. The probability that the ball drawn is not of red colour is :

- (a) $\frac{3}{14}$ (b) $\frac{4}{14}$ (c) $\frac{11}{14}$ (d) $\frac{7}{14}$

Q18. CBSE 2026 · 1 mark The total number of outcomes in the experiment of simultaneous throw of three dice is:

- (a) 6 (b) 18 (c) 36 (d) 216

Q19. CBSE 2026 · 1 mark The sum of outcomes in favour of event E is:

- (a) 4 (b) 6 (c) 10 (d) 26

Q20. CBSE 2026 · 1 mark outcomes in favour of event E is:

- (a) 4 (b) 6 (c) 10 (d) 26

Q21. CBSE 2026 · 1 mark The number of outcomes in favour of event E is:

- (a) 4 (b) 6 (c) 10 (d) 26

Q22. CBSE 2025 · 1 mark A card is selected at random from a deck of 52 playing cards. The probability of it being a red face card is:

- (a) $\frac{3}{26}$ (b) $\frac{3}{13}$ (c) $\frac{1}{13}$ (d) $\frac{2}{13}$

Q23. CBSE 2025 · 1 mark Assertion (A): The probability of selecting a number at random from the numbers 1 to 20 is 1. Reason (R): For any event E, if $P(E) = 1$, then E is called a sure event.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q24. CBSE 2025 · 1 mark Assertion (A): The probability of selecting a number at random from the numbers 1 to 20 is 1. Reason (R): For any event E, if $P(E) = 1$, then E is called a sure event. Select the correct answer from the codes (A), (B), (C) and (D) as given below. (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A). (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A). (C) Assertion (A) is true, but Reason (R) is false. (D) Assertion (A) is false, but Reason (R) is true.

- (a) Both A and R are true, R is the correct explanation
(b) Both A and R are true, R is not the correct explanation
(c) A is true, but R is false (d) A is false, but R is true

Q25. CBSE 2025 · 1 mark A card is drawn at random from a pack of 52 cards. What is the probability that the card drawn is a spade or a king?

- (a) $\frac{4}{13}$ (b) $\frac{1}{4}$ (c) $\frac{13}{52}$ (d) $\frac{17}{52}$

Q26. CBSE 2025 · 1 mark The probability of drawing an even prime number out of numbers from 1 to 30 is:

- (a) $\frac{1}{30}$ (b) $\frac{1}{15}$ (c) $\frac{2}{15}$ (d) 0

Q27. CBSE 2025 · 1 mark In a cricket match, a batsman hits the boundary 7 times out of the 42 balls he plays. The probability of his not hitting a boundary is:

- (a) $\frac{7}{42}$ (b) $\frac{35}{42}$ (c) $\frac{5}{6}$ (d) $\frac{1}{6}$

Q28. CBSE 2025 · 1 mark If all the red face cards are removed from the deck of 52 playing cards, then the probability of getting a black jack from the remaining cards is:

- (a) $\frac{1}{50}$ (b) $\frac{1}{49}$ (c) $\frac{2}{49}$ (d) $\frac{1}{26}$

Q29. CBSE 2025 · 1 mark A die is thrown once. The probability of getting a number which is not a factor of 36, is:

- (a) $\frac{1}{6}$ (b) $\frac{1}{3}$ (c) $\frac{1}{2}$ (d) $\frac{2}{3}$

Q30. CBSE 2024 · 1 mark The probability of getting a sum of 8, when two dice are thrown simultaneously, is:

- (a) $\frac{1}{12}$ (b) $\frac{1}{9}$ (c) $\frac{1}{6}$ (d) $\frac{5}{36}$

Q31. CBSE 2024 · 1 mark A box contains cards numbered 6 to 50. A card is drawn at random from the box. The probability that the drawn card has a number which is a perfect square, is:

- (a) $\frac{5}{44}$ (b) $\frac{1}{9}$ (c) $\frac{1}{11}$ (d) $\frac{7}{45}$

Q32. CBSE 2024 · 1 mark Two friends were born in the year 2000. The probability that they have the same birthday is:

- (a) $\frac{1}{365}$ (b) $\frac{364}{365}$ (c) $\frac{1}{366}$ (d) $\frac{365}{366}$

Q33. CBSE 2024 · 1 mark Two dice are rolled together. The probability of getting the sum of the two numbers to be more than 10, is

- (a) $\frac{1}{9}$ (b) $\frac{1}{6}$ (c) $\frac{7}{12}$ (d) $\frac{1}{12}$

Q34. CBSE 2024 · 1 mark A box contains cards numbered 6 to 55. A card is drawn at random from the box. The probability that the drawn card has a number which is a perfect square, is

- (a) $\frac{7}{50}$ (b) $\frac{7}{55}$ (c) $\frac{1}{10}$ (d) $\frac{5}{49}$

Q35. CBSE 2024 · 1 mark Two dice are thrown together. The probability that they show different numbers is:

- (a) $\frac{1}{6}$ (b) $\frac{5}{6}$ (c) $\frac{1}{3}$ (d) $\frac{2}{3}$

Q36. CBSE 2024 · 1 mark The probability of guessing the correct answer to a certain test question is $\frac{x}{6}$. If the probability of not guessing the correct answer to this question is $\frac{2}{3}$, then the value of x is:

- (a) 2 (b) 3 (c) 4 (d) 6

Q37. CBSE 2024 · 1 mark If a digit is chosen at random from the digits 1, 2, 3, 4, 5, 6, 7, 8, 9; then the probability that this digit is an odd prime number is:

- (a) $\frac{1}{3}$ (b) $\frac{2}{3}$ (c) $\frac{4}{9}$ (d) $\frac{5}{9}$

Q38. CBSE 2024 · 1 mark Assertion (A): In a cricket match, a batsman hits a boundary 9 times out of 45 balls he plays. The probability that in a given ball, he does not hit the boundary is $\frac{4}{5}$. Reason (R): $P(E) + P(\text{not } E) = 1$

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q39. CBSE 2024 · 1 mark Two coins are tossed simultaneously. The probability of getting at most one tail is:

- (a) $\frac{1}{2}$ (b) $\frac{1}{4}$ (c) $\frac{3}{4}$ (d) 1



Q40. CBSE 2024 · 1 mark A bag contains 3 red balls, 5 white balls and 7 black balls. The probability that a ball drawn from the bag at random will be neither red nor black is:

- (a) $1/3$ (b) $1/5$ (c) $7/15$ (d) $8/15$

Q41. CBSE 2024 · 1 mark The probability of getting a bad egg in a lot of 400 eggs is 0.045. The number of good eggs in the lot is:

- (a) 18 (b) 180 (c) 382 (d) 220

Q42. CBSE 2024 · 1 mark Two dice are tossed simultaneously. The probability of getting odd numbers on both the dice is:

- (a) $36/6$ (b) $36/3$ (c) $36/12$ (d) $36/9$

Q43. CBSE 2024 · 1 mark For an event E, if $P(E) + P(\bar{E}) = q$, then the value of $q^2 - 4$ is:

- (a) -3 (b) 3 (c) 5 (d) -5

Q44. CBSE 2024 · 1 mark From the letters of the word "MOBILE", a letter is selected at random. The probability that the selected letter is a vowel, is:

- (a) $3/7$ (b) $1/6$ (c) $1/2$ (d) $1/3$

Q45. CBSE 2024 · 1 mark For an event E, if $P(E) + P(\bar{E}) = q$, then the value of $q^2 - 4$ is:

- (a) -3 (b) 3 (c) 5 (d) -5

Q46. CBSE 2024 · 1 mark The probability of throwing a number greater than 2 with a fair die is:

- (a) $2/3$ (b) $1/3$ (c) $1/2$ (d) $5/6$

Q47. CBSE 2024 · 1 mark One ticket is drawn at random from a bag containing tickets numbered 1 to 40. The probability that the selected ticket has a number which is a multiple of 7 is:

- (a) $1/7$ (b) $1/8$ (c) $1/5$ (d) $7/40$

Q48. CBSE 2024 · 1 mark What is the probability that a number selected randomly from the numbers 1, 2, 3, ..., 15 is a multiple of 4?

- (a) $15/4$ (b) $15/6$ (c) $15/3$ (d) $15/5$

Q49. CBSE 2024 · 1 mark If $P(A)$ denotes the probability of an event A, then

- (a) $P(A) < 0$ (b) $P(A) > 1$ (c) $0 < P(A) < 1$ (d) $-1 < P(A) < 1$

Q50. CBSE 2023 · 1 mark A bag contains 100 cards numbered 1 to 100. A card is drawn at random from the bag. What is the probability that the number on the card is a perfect cube?

- (a) $2/01$ (b) $50/3$ (c) $25/1$ (d) $100/7$

Q51. CBSE 2023 · 1 mark If three coins are tossed simultaneously, what is the probability of getting at most one tail?

- (a) $3/8$ (b) $4/8$ (c) $5/8$ (d) $7/8$

Q52. CBSE 2023 · 1 mark In a single throw of two dice, the probability of getting 12 as a product of two numbers obtained is:

- (a) $1/9$ (b) $2/9$ (c) $4/9$ (d) $5/9$

Q53. CBSE 2023 · 1 mark In a lottery, there are 5 prizes and 20 blanks. The probability of getting a prize is :

- (a) $1/4$ (b) $1/20$ (c) $1/25$ (d) $1/5$

Q54. CBSE 2023 · 1 mark Two dice are thrown together. The probability of getting the difference of numbers on their upper faces equals to 3 is :

- (a) $1/9$ (b) $2/9$ (c) $1/6$ (d) $1/12$

Q55. CBSE 2023 · 1 mark A card is drawn at random from a well-shuffled pack of 52 cards. The probability that the card drawn is not an ace is :

- (a) $1/13$ (b) $9/13$ (c) $4/13$ (d) $12/13$

Q56. CBSE 2023 · 1 mark Assertion (A): The probability that a leap year has 53 Sundays is $2/7$. Reason (R): The probability that a non-leap year has 53 Sundays is $5/7$.

- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true but Reason (R) is false.
(d) Assertion (A) is false but Reason (R) is true.

Q57. CBSE 2023 · 1 mark A bag contains 5 red balls and n green balls. If the probability of drawing a green ball is three times that of a red ball, then the value of n is:

- (a) 18 (b) 15 (c) 10 (d) 20

Q58. CBSE 2023 · 1 mark Two coins are tossed together. The probability of getting at least one tail is :

- (a) $1/4$ (b) $1/2$ (c) $3/4$ (d) 1

Q59. CBSE 2023 · 1 mark Which of the following numbers cannot be the probability of happening of an event ?

- (a) 0 (b) 0.107 (c) 0.07 (d) $3/0.7$

Q60. CBSE 2023 · 1 mark Two dice are rolled together. What is the probability of getting a sum greater than 10?

- (a) $9/1$ (b) $6/1$ (c) $12/1$ (d) $18/5$

Q61. CBSE 2023 · 1 mark One card is drawn at random from a well shuffled pack of 52 playing cards. The probability that the drawn card is a queen, is :

- (a) $1/34$ (b) $4/52$ (c) $1/32$ (d) $2/61$

VERY SHORT ANSWER (12)

Q62. CBSE 2026 · 2 marks Find the probability that a number selected at random from the numbers 30, 31, 32, 33, ..., 60 is (i) a prime number (ii) a multiple of 6.

Q63. CBSE 2026 · 2 marks (a) Find the probability that a number selected at random from the numbers 30, 31, 32, 33, ..., 60 is (i) a prime number (ii) a multiple of 6. OR (b) Slips of letters of the word 'BACKGROUND' are put in a bowl and thoroughly mixed. One slip is picked up at random. Find the probability that picked up slip's letter is (i) a vowel (ii) present in the word 'BALL'.

Q64. CBSE 2026 · 2 marks All the red face cards are removed from a pack of 52 playing cards. The remaining cards are well shuffled and then a card is drawn at random. Find the probability of getting a: (i) red card (ii) a king or queen

Q65. CBSE 2026 · 2 marks A bag contains 25 balls. Some of them are yellow and others are green. One ball is drawn at random. If probability of getting a green ball is $3/5$, then find the number of yellow balls.



Q66. CBSE 2025 · 2 marks The probability of guessing the correct answer of a certain test question is $x/2$. If the probability of not guessing the correct answer is $x/3$, then find the value of x .

Q67. CBSE 2025 · 2 marks The probability of guessing the correct answer of a certain test question is $x/3$. If the probability of not guessing the correct answer is $x/2$, then find the value of x .

Q68. CBSE 2025 · 2 marks The probability of guessing the correct answer of a certain test question is $x/3$. If the probability of not guessing the correct answer is $x/6$, then find the value of x .

Q69. CBSE 2024 · 2 marks One card is drawn at random from a well shuffled deck of 52 cards. Find the probability that the card drawn (i) is queen of hearts; (ii) is not a jack.

Q70. CBSE 2024 · 2 marks A carton consists of 60 shirts of which 48 are good, 8 have major defects and 4 have minor defects. Nigam, a trader, will accept the shirts which are good but Anmol, another trader, will only reject the shirts which have major defects. One shirt is drawn at random from the carton. Find the probability that it is acceptable to Anmol.

Q71. CBSE 2024 · 2 marks The king, queen and ace of clubs and diamonds are removed from a deck of 52 playing cards and the remaining cards are shuffled. A card is randomly drawn from the remaining cards. Find the probability of getting (i) a card of clubs. (ii) a red coloured card.

Q72. CBSE 2024 · 2 marks A lot consists of 165 ball pens of which 30 are defective and the others are good. Rakshita will buy a pen if it is good. The shopkeeper draws one pen at random and gives it to Rakshita. What is the probability that she will buy it?

Q73. CBSE 2023 · 2 marks If a fair coin is tossed twice, find the probability of getting 'at most one head'.

SHORT ANSWER (16)

Q74. CBSE 2026 · 3 marks Two dice are rolled together. Find the probability that: (i) the sum of the numbers obtained is 10. (ii) the product of the numbers obtained is 6.

Q75. CBSE 2026 · 3 marks Two dice are rolled together. Find the probability that at least one of the numbers obtained is a multiple of 3.

Q76. CBSE 2026 · 3 marks Two dice are rolled together. Find the probability that (i) in the obtained outcomes one number is twice the another. (ii) both the numbers obtained are greater than 4.

Q77. CBSE 2026 · 3 marks A lot consists of 200 pens of which 180 are good and the rest are defective. A customer will buy a pen if it is not defective. The shopkeeper draws a pen at random and gives it to the customer. What is the probability that the customer will not buy it? Another lot of 100 pens containing 80 good pens is mixed with the previous lot of 200 pens. The shopkeeper now draws one pen at random from the entire lot and gives it to the customer. What is the probability that the customer will buy the pen?

Q78. CBSE 2026 · 3 marks A game of chance consists of spinning a wheel which comes to rest at one of the numbers from 1 to 10 with equal probabilities. What is the probability that the wheel stops at (i) a prime number greater than 2? (ii) an odd number less than 9? (iii) a multiple of 4?

Q79. CBSE 2026 · 3 marks A box contains 6 blue, 4 white and 8 red marbles. A marble is drawn at random from this box. Find the probability that the marble so drawn is: (i) white (ii) white or red (iii) not red

Q80. CBSE 2025 · 3 marks Two dice are thrown at the same time. Determine the probability that the difference of the numbers on the two dice is 2.

Q81. CBSE 2025 · 3 marks Two dice are rolled together. Find the probability of getting: (i) a multiple of 2 on one and a multiple of 3 on the other die. (ii) the product of two numbers on the top of the two dice is a perfect square number.

Q82. CBSE 2025 · 3 marks Three unbiased coins are tossed simultaneously. Find the probability of getting: (a) exactly two tails (b) at least one head (c) at most two heads

Q83. CBSE 2025 · 3 marks If 65% of the population has black eyes, 25% have brown eyes and the remaining have blue eyes, what is the probability that a person selected at random has: (a) blue eyes? (b) brown or black eyes?

Q84. CBSE 2025 · 3 marks All face cards of spades are removed from a pack of 52 playing cards and the remaining pack is shuffled well. A card is then drawn at random from the remaining pack. Find the probability of getting: (a) a face card (b) an ace or a jack

Q85. CBSE 2024 · 3 marks (a) Three coins are tossed simultaneously. What is the probability of getting (i) at least one head? (ii) exactly two tails? (iii) at most one tail? OR (b) A box contains 90 discs which are numbered 1 to 90. If one disc is drawn at random from the box, find the probability that it bears a: (i) 2-digit number less than 40. (ii) number divisible by 5 and greater than 50. (iii) a perfect square number.

Q86. CBSE 2024 · 3 marks (a) Three coins are tossed simultaneously. What is the probability of getting (i) at least one head? (ii) exactly two tails? (iii) at most one tail?

Q87. CBSE 2024 · 3 marks Three unbiased coins are tossed simultaneously. Find the probability of getting: (i) at least one head (ii) exactly one tail (iii) two heads and one tail.

Q88. CBSE 2024 · 3 marks A jar contains 54 marbles, each of which is blue, green or white. The probability of selecting a blue marble at random from the jar is $1/3$, and the probability of selecting a green marble at random is $4/9$. How many white marbles does this jar contain?

Q89. CBSE 2024 · 3 marks Two dice are tossed simultaneously. Find the probability of getting (a) an even number on both the dice.

CASE-BASED (8)

CASE STUDY · CBSE 2026

Raghav has a collection of balls of different colours. He has a total of 35 balls in his basket out of which seven are black in



colour and eight are yellow in colour. Out of remaining balls, some are white and the rest are red.

Q90. CBSE 2026 · 4 marks If the probability of drawing a red ball at random from the basket is three times that of a white ball, then find the number of red balls in the basket.

CASE STUDY · CBSE 2025

Rahul is a lucky charm for his cricket team. He has a jar of cards with numbers from 10 to 74. Before each match, he draws a card from the jar. If the card bears an even number, the team wins. If the number is even and divisible by 5, they win by a big margin. If the number is an odd number less than 30, they win by a small margin. And if the number is a prime number between 50 and 74, they lose.

Q91. CBSE 2025 · 1 mark What is the probability that Rahul draws a card with an even number?

CASE STUDY · CBSE 2024

In a survey on holidays, 120 people were asked to state which type of transport they used on their last holiday. The following pie chart shows the results of the survey.

Q92. CBSE 2024 · 1 mark If one person is selected at random, find the probability that he/she travelled by bus or ship.

CASE STUDY · CBSE 2023

Computer-based learning (CBL) refers to any teaching methodology that makes use of computers for information transmission. At an elementary school level, computer applications can be used to display multimedia lesson plans. A survey was done on 1000 elementary and secondary schools of Assam and they were classified by the number of computers they had. Number of Computers: 1-10, 11-20, 21-50, 51-100, 101 and more. Number of Schools: 250, 200, 290, 180, 80.

Q93. CBSE 2023 · 1 mark Find the probability that the school chosen at random has more than 100 computers.

CASE STUDY · CBSE 2023

A survey was done on 1000 elementary and secondary schools of Assam and they were classified by the number of computers they had. Number of Computers: 1-10 (250 schools), 11-20 (200 schools), 21-50 (290 schools), 51-100 (180 schools), 101 and more (80 schools).

Q94. CBSE 2023 · 1 mark Find the probability that the school chosen at random has more than 100 computers.

CASE STUDY · CBSE 2023

A middle school decided to run the following spinner game as a fund-raiser on Christmas Carnival. Making Purple: Spin each spinner once. Blue and red make purple. So, if one spinner shows blue (B) and the other shows red (R), or one shows red (R) and the other shows blue (B), you win.

Q95. CBSE 2023 · 1 mark List all possible outcomes of the game.

CASE STUDY · CBSE 2023

A middle school decided to run the following spinner game as a fund-raiser on Christmas Carnival. Making Purple: Spin each spinner once. Blue and red make purple. So, if one spinner shows Blue and the other shows Red, you win.

Q96. CBSE 2023 · 1 mark List all possible outcomes of the game.

CASE STUDY · CBSE 2023

A middle school decided to run the following spinner game as a fund-raiser on Christmas Carnival. Making Purple : Spin each spinner once. Blue and red make purple. So, if one spinner shows blue (B) and the other shows red (R), then you win.

Q97. CBSE 2023 · 1 mark (i) List all possible outcomes of the game.

