Chapter 1: **Real Numbers**

MULTIPLE-CHOICE QUESTIONS

For Basic and Standard Levels

Choose the correct answer from the given four options in the following questions:

1. The number which when divided by 19 gives the quotient 4 and remainder 4 is

(*a*) 76 (*b*) 80 (*c*) 72 (*d*) 152

2. For some integer q every even integer is of the form

(*a*) q (*b*) $q + 1$ (*c*) $2q$ (*d*) $2q + 1$

3. For some integer m, every odd integer is of the form

(*a*) $m + 1$ (*b*) m (*c*) $2m$ (*d*) $2m + 1$

4. Any one of the numbers a, $(a + 2)$ and $(a + 4)$ is a multiple of

(*a*) 2 (*b*) 3 (*c*) 5 (*d*) 7 **[CBSE 2010]**

5. Euclid's division lemma states that for two positive integers a and b, there exist unique integers q and r such that $a = bq + r$, where r must satisfy

(*a*) $0 < r < b$ (*b*) $0 < r \leq b$

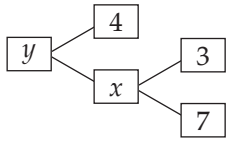
(*c*) $0 \leq r < b$ (*d*) $1 < r < b$ **[CBSE 2012]**

6. For any positive integer a and 3, there exist unique integers q and r such that $a = 3q + r$, where r must satisfy

(*a*) $0 \leq r < 3$ (*b*) $1 < r < 3$

(*c*) $0 < r < 3$ (*d*) $0 < r \leq 3$ **[CBSE SP 2012]**

7. The values of x and y in the given figure are



(*a*) $x = 10, y = 14$ (*b*) $x = 21, y = 84$

(*c*) $x = 21, y = 25$ (*d*) $x = 10, y = 40$

8. The maximum number of factors of a prime number is

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

9. The prime factors of the denominator of the fraction $\frac{3}{80}$ are

(*a*) 5 and 8 (*b*) 2 and 5 (*c*) 2, 4 and 5 (*d*) 1, 2 and 5

10. How many prime numbers are of the form $10n + 1$, where n is a natural number such that $1 \leq n < 10$?

(*a*) 5 (*b*) 6 (*c*) 4 (*d*) 3

11. If a and b are coprime, then a^2 and b^2 are
(a) even numbers (b) not coprime
(c) odd numbers (d) coprime

12. If 3 is the least prime factor of p and 5 is the least prime factor of q, then the least prime factor of $(p + q)$ is
(a) 11 (b) 2 (c) 5 (d) 3
[**Hint:** Since 3 is the least prime factor of p, so the other prime factors of p are ≥ 3 but not 2. $\therefore$ p must be an odd number. Similarly q is an odd number. $\therefore$ $(p + q)$ is an even number. $\therefore$ Least prime factor of $(p + q)$ is 2.]

13. If a and b ($a > b$) are two odd prime numbers, then $a^2 - b^2$ is
(a) composite (b) even prime (c) odd prime (d) prime

14. $119^2 - 111^2$ is a
(a) prime number (b) composite number
(c) an odd prime number (d) an odd composite number
[CBSE SP 2011]

15. The exponent of 3 in the prime factorisation of 243 is
(a) 3 (b) 5 (c) 4 (d) 6

16. If p and q are two prime numbers, then their HCF is
(a) 2 (b) 0 (c) either 1 or 2 (d) 1

17. The HCF of the smallest composite number and the smallest prime number is
(a) 2 (b) 1 (c) 4 (d) 3 **[CBSE 2008]**

18. The HCF of two consecutive integers is
(a) 0 (b) 1 (c) 4 (d) 2 **[CBSE SP 2011]**

19. If $m = dn + r$, where m, n are positive integers and d and r are integers, then n is the HCF of m, n if
(a) $r = 1$ (b) $0 < r \leq 1$
(c) $r = 0$ (d) r is a real number **[CBSE SP 2011]**

20. If LCM (60, 72) = 360, then HCF (60, 72) is
(a) 18 (b) 6 (c) 12 (d) 24

21. If the product of two numbers is 5780 and their HCF is 17, then their LCM is
(a) 9826 (b) 680 (c) 340 (d) 425

22. If HCF and LCM of two numbers are 4 and 9696, then the product of the two numbers is
(a) 9696 (b) 24242 (c) 38784 (d) 4848 **[CBSE 2010]**

23. If HCF (a, 8) = 4, LCM (a, 8) = 24, then a is
(a) 8 (b) 10 (c) 12 (d) 14 **[CBSE SP 2011]**

24. If two positive integers A and B are written as A = ab^2 and B = a^3b, where a, b are prime numbers, then LCM (A, B) is
(a) ab (b) a^2b^2 (c) a^3b^2 (d) a^4b^3
[CBSE SP 2011]

25. If two positive integers A and B are written as A = ab^3 and B = a^3b^2, a, b being prime numbers, then HCF (A, B) is

(a) a^2b^2 (b) ab^2 (c) a^3b^3 (d) ab

26. LCM of $2^3 \times 3^2$ and $2^2 \times 3^3$ is

(a) 2^3 (b) 3^3

(c) $2^3 \times 3^3$ (d) $2^3 \times 3^2$ **[CBSE SP 2012]**

27. $\pi = \frac{22}{7}$ is

(a) a rational number (b) an irrational number.

(c) a prime number (d) an even number **[CBSE SP 2012]**

28. If x and y are two rational numbers then $x + y$ is

(a) an irrational number

(b) a rational number

(c) either rational or irrational number

(d) neither rational nor irrational number

29. If x is a rational number and y is an irrational number, then $x + y$, $x - y$ and xy are all

(a) rational numbers

(b) irrational numbers

(c) either rational or irrational numbers

(d) neither rational nor irrational numbers

30. $\sqrt{5} - 3 - 2$ is

(a) a rational number (b) a natural number

(c) equal to zero (d) an irrational number **[CBSE 2010]**

31. $2 + \sqrt{3} + \sqrt{5}$ is

(a) a natural number (b) an integer

(c) a rational number (d) an irrational number **[CBSE 2010]**

32. $3 + \sqrt{5}$ is

(a) a rational number (b) an irrational number

(c) an integer (d) not real

33. The smallest rational number which should be added to $4 - \sqrt{5}$ to get a rational number is

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

34. The smallest irrational number by which $\sqrt{18}$ should be multiplied so as to get a rational number is

(a) $\sqrt{18}$ (b) $2\sqrt{2}$ (c) $\sqrt{2}$ (d) 2

35. 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*) $\sqrt{36}\sqrt{2}$ **[CBSE SP 2011]**

36. Which of the following is not an irrational number?

(*a*) $3 + \sqrt{5}$ (*b*) $7 + \sqrt{4}$ (*c*) $\sqrt{7} + \sqrt{4}$ (*d*) $4 - \sqrt{2}$

37. If p is a prime number and p divides k^2, then p divides

(*a*) $2k^2$ (*b*) k

(*c*) $3k$ (*d*) none of these **[CBSE 2010]**

38. Rational number $\frac{p}{q}, q \neq 0$ will be terminating decimal if the prime factorisation of q is of the form (m and n are positive integers)

(*a*) $2^m \times 3^n$ (*b*) $2^m \times 5^n$

(*c*) $3^m \times 5^n$ (*d*) $3^m \times 7^n$ **[CBSE SP 2010]**

39. Which of the following rational numbers have a terminating decimal expression?

(*a*) $\frac{125}{441}$ (*b*) $\frac{77}{210}$ (*c*) $\frac{15}{1600}$ (*d*) $\frac{129}{2^2 \times 5^2 \times 7^2}$

[CBSE SP 2011]

40. The decimal expression of $\frac{63}{72 \times 175}$ is

(*a*) terminating (*b*) non-terminating

(*c*) non-terminating and repeating (*d*) none of these **[CBSE 2010]**

41. The decimal expansion of π is

(*a*) terminating (*b*) non-terminating non-repeating

(*c*) non-terminating (*d*) does not exist **[CBSE SP 2011]**

42. The decimal expansion of the number $\frac{31}{2^2 5}$ will terminate after

(*a*) one decimal place (*b*) two decimal places

(*c*) three decimal places (*d*) more than three decimal places

[CBSE SP 2011]

43. The decimal expansion of $\frac{17}{8}$ will terminate after how many places of decimals?

(*a*) 1 (*b*) 2

(*c*) 3 (*d*) will not terminate **[CBSE SP 2011]**

44. The decimal expansion of the rational number $\frac{14587}{1250}$ will terminate after

(*a*) one decimal place (*b*) two decimal places

(*c*) three decimal places (*d*) four decimal places **[CBSE SP 2011]**

45. The decimal expansion of number $\frac{441}{2^2 \times 5^3 \times 7}$ has

(*a*) a terminating decimal (*b*) non-terminating but repeating

(*c*) non-terminating non-repeating (*d*) terminating after two places of decimal

[CBSE SP 2012]

For Standard Level

46. Given that HCF (2520, 6600) = 40, LCM (2520, 6600) = 252 × k, then the value of k is

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

[CBSE SP 2011]

47. If $a = 3 \times 5$, $b = 3 \times 5^2$ and $c = 2^5 \times 5$, then LCM (a, b, c) and HCF (a, b, c) are

(a) 1200, 5 (b) 2400, 5

(c) 2400, 15 (d) 1200, 15

48. If $a = 2^2 \times 3^x$, $b = 2^2 \times 3 \times 5$, $c = 2^2 \times 3 \times 7$, and LCM ($a$, b, c) = 3780, then x is equal to

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

49. If the HCF of 85 and 153 is expressible in the form $85n - 153$, then the value of n is

(a) 3 (b) 2 (c) 4 (d) 1 **[CBSE SP 2011]**

50. If the HCF of 408 and 1032 is expressible in the form $1032m - 408 \times 5$, then the value of m is

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

51. The greatest number of 6 digits exactly divisible by 15, 24 and 36 is

(a) 999924 (b) 999639

(c) 999999 (d) 999720

52. The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is

(a) 10 (b) 100 (c) 504 (d) 2520

53. The largest number which divides 281 and 1249 leaving remainder 5 and 7 respectively is

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

54. The smallest number which when divided by 17, 23 and 29 leaves a remainder 11 in each case is

(a) 493 (b) 11350

(c) 11339 (d) 667

55. $1.\overline{29}$ is

(a) an integer (b) a rational number

(c) a natural number (d) an irrational number

56. Prime factorisation of the denominator of the rational number 26.1234

(a) is of the form $2^m \times 5^n$ where m, n are integers

(b) has factors other than 2 or 5

(c) is of the form $2^m \times 5^n$ where m, n are non-negative integers

(d) is of the form $2^m \times 5^n$ where m and n are positive integers

57. Prime factorisation of the denominator of the rational number $52.\overline{9678}$ is

(*a*) of the form $2^m \times 5^n$ where m, n are integers

(*b*) of the form $2^m \times 5^n$ where m and n are positive integers

(*c*) of the form $2^m \times 5^n$ where m, n are rational numbers

(*d*) not of the form $2^m \times 5^n$ where m, n are non-negative integers

58. The smallest rational number by which $\frac{1}{3}$ should be multiplied so that its decimal expansion terminates after one place of decimal is

(*a*) $\frac{3}{10}$ (*b*) $\frac{1}{10}$ (*c*) 3 (*d*) $\frac{3}{100}$

Chapter 2: **Polynomials**

MULTIPLE-CHOICE QUESTIONS

For Basic and Standard Levels

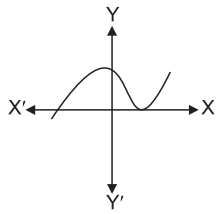
Choose the correct answer from the given four options in the following questions:

1. Which of the following is a polynomial?

(*a*) $3x^2 + \frac{1}{x} - 5$ (*b*) $-2x^2 + 5\sqrt{x} + 8$

(*c*) $\sqrt{2}\,x^3 + \sqrt{3}\,x^2 + \sqrt{5}\,x - 3$ (*d*) $\frac{3}{x^3} + 4x^2 - 5x + \frac{1}{3}$

2. The graph of $y = p(x)$ is given. The number of zeroes of $p(x)$ are:



(*a*) 0 (*b*) 3

(*c*) 2 (*d*) 4 **[CBSE SP 2011]**

3. A real number α is called zero of the polynomial $f(x)$ when

(*a*) $f(\alpha) = -2$ (*b*) $f(\alpha) = 0$ (*c*) $f(\alpha) = 1$ (*d*) $f(\alpha) = -1$

4. The zeroes of the polynomial $x^2 + 7x + 12$ are:

(*a*) 3, 4 (*b*) –3, –4 (*c*) –3, 4 (*d*) 3, –4

5. If $p(x) = x^2 + 5x + 2$, then the value of $p(3) + p(2) + p(0)$ is:

(*a*) 40 (*b*) 44 (*c*) 8 (*d*) 42

6. The zeroes of the quadratic polynomial $x^2 + 43x + 222$ are:

(*a*) both equal (*b*) one positive one negative

(*c*) both negative (*d*) both positive

7. The quadratic polynomial whose zeroes are $5 + \sqrt{2}$ and $5 - \sqrt{2}$ is:

(*a*) $x^2 - 5x + 21$ (*b*) $x^2 + 5x + 21$

(*c*) $x^2 - 10x + 23$ (*d*) $x^2 + 10x + 23$

8. A quadratic polynomial whose sum and product of zeroes are $\sqrt{2}$ and $\frac{1}{3}$ respectively, is:

(*a*) $3x^2 + 3\sqrt{2}\,x + 1$ (*b*) $3x^2 - 3\sqrt{2}\,x + 1$

(*c*) $3x^2 - 3\sqrt{2}\,x - 1$ (*d*) $-3x^2 - 3\sqrt{2}\,x + 1$

9. A quadratic polynomial, one of whose zero 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*) $x^2 + 4x + 1$

10. A quadratic polynomial, one of whose zero is $\sqrt{5}$ and the product of whose zeroes is $-2\sqrt{5}$ is

(*a*) $x^2 + (2 - \sqrt{5})x - 2\sqrt{5}$ (*b*) $x^2 - (2 - \sqrt{5})x + 2\sqrt{5}$

(*c*) $x^2 + (2 - \sqrt{5})x + 2\sqrt{5}$ (*d*) $x^2 - (2 - \sqrt{5})x - 2\sqrt{5}$

11. If the product of the zeroes of the quadratic polynomial $3x^2 + 5x + k$ is $\frac{-2}{3}$, then

(*a*) $k = -3$ (*b*) $k = -2$ (*c*) $k = 2$ (*d*) $k = 3$

12. If one zero of the polynomial $p(x) = 5x^2 + 13x - k$, is the reciprocal of the other, then

(*a*) $k = 13$ (*b*) $k = 5$ (*c*) $k = -5$ (*d*) $k = -13$

13. If one of the zeroes of the quadratic polynomial $(\alpha - 1)x^2 + \alpha x + 1$ is -3, then the value of α is

(*a*) $\frac{-2}{3}$ (*b*) $\frac{2}{3}$ (*c*) $\frac{4}{3}$ (*d*) $\frac{3}{4}$

14. If α and β are the zero of the polynomial $f(x) = px^2 - 2x + 3p$ and $\alpha + \beta = \alpha\beta$, then the value of p is

(*a*) $\frac{-2}{3}$ (*b*) $\frac{2}{3}$ (*c*) $\frac{1}{3}$ (*d*) $\frac{-1}{3}$ **[CBSE SP 2011]**

15. If α and β are the zeroes of the polynomial $x^2 - 6x + k$ and $3\alpha + 2\beta = 20$, then

(*a*) $k = -8$ (*b*) $k = 16$ (*c*) $k = -16$ (*d*) $k = 8$

16. If p and q are the zeroes of the polynomial $ax^2 - 5x + c$ and $p + q = pq = 10$, then

(*a*) $a = 5, c = \frac{1}{2}$ (*b*) $a = 1, c = \frac{5}{2}$ (*c*) $a = \frac{5}{2}, c = 1$ (*d*) $a = \frac{1}{2}, c = 5$

17. The polynomial which when divided by $-x^2 + x - 1$ gives a quotient $x - 2$ and remainder 3 is

(*a*) $x^3 - 3x^2 + 3x - 5$ (*b*) $-x^3 - 3x^2 - 3x - 5$

(*c*) $-x^3 + 3x^2 - 3x + 5$ (*d*) $x^3 - 3x^2 - 3x + 5$

18. The degree of the remainder when a cubic polynomial is divided by a quadratic polynomial is

(*a*) ≤ 1 (*b*) ≥ 1 (*c*) 2 (*d*) ≥ 2

19. If α, β and γ be the zeroes of the polynomial $x^3 - x^2 - 10x - 8$, then the values of $\alpha\beta\gamma$ and $\alpha\beta + \beta\gamma + \gamma\alpha$ are respectively

(*a*) 4, – 5 (*b*) 8, –10 (*c*) –8, 10 (*d*) – 4, 5

20. A cubic polynomial whose zeroes are – 2, – 3 and – 1 is

(*a*) $x^3 + 11x^2 + 6x + 1$ (*b*) $x^3 + 6x^2 + 11x + 6$

(*c*) $x^3 + 11x^2 + x + 6$ (*d*) $x^3 + 6x^2 + 6x + 11$

21. If two zeroes of the polynomial $x^3 + 7x^2 - 2x - 14$, are $\sqrt{2}$ and $-\sqrt{2}$ then the third zero is

(*a*) 7 (*b*) –7 (*c*) –14 (*d*) 14

22. The other two zeroes of the polynomial $x^3 - 8x^2 + 19x - 12$ if its one zero is $x = 1$, are

(*a*) 3, 4 (*b*) 3, –4 (*c*) –1, –4 (*d*) –1, 4

23. If two zeroes of the polynomial $x^3 - 5x^2 - 16x + 80$ are equal in magnitude but opposite in sign, then zeroes are

(*a*) 4, –4, 5 (*b*) 3, –3, –5 (*c*) 2, –2, 3 (*d*) 1, –1, 4

24. If α, β and γ are the zeroes of the polynomial $6x^3 + 3x^2 - 5x + 1$ then $\alpha^{-1} + \beta^{-1} + \gamma^{-1}$ is equal to

(*a*) 5 (*b*) 6 (*c*) -5 (*d*) -6

25. The graph of the polynomial $p(x)$ intersects the x-axis three times in distinct points, then which of the following could be an expression for $p(x)$?

(*a*) $4 - 4x - x^2 + x^3$ (*b*) $3x^2 + 3x - 3$

(*c*) $3x + 3$ (*d*) $x^2 - 9$ **[CBSE SP 2012]**

26. The sum and product respectively of zeroes of the polynomial $x^2 - 4x + 3$ are

(*a*) 3, 3 (*b*) 4, 3 (*c*) -4 , $+3$ (*d*) $\frac{4}{3}$, 1

For Standard Level

27. If the sum of squares of zeroes of the quadratic polynomial $3x^2 + 5x + k$ is $\frac{-2}{3}$, then the value of k is

(*a*) $\frac{31}{6}$ (*b*) $\frac{31}{9}$ (*c*) $\frac{25}{6}$ (*d*) $\frac{25}{9}$

28. If α, β are the zeroes of the polynomial $6y^2 - 2 + y$, then the value of $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$ is

(*a*) $\frac{-25}{36}$ (*b*) $\frac{25}{12}$ (*c*) $\frac{-25}{12}$ (*d*) $\frac{25}{36}$

29. If α and β are the zeroes of the quadratic polynomial $x^2 - 5x + 4$ then $\frac{1}{\alpha} + \frac{1}{\beta} - 2\alpha\beta$ is equal to

(*a*) $\frac{-37}{4}$ (*b*) $\frac{37}{4}$ (*c*) $\frac{-27}{4}$ (*d*) $\frac{27}{4}$

30. If α and β are the zeroes of the polynomial $x^2 - 2 + x$ then $\left(\frac{1}{\alpha} - \frac{1}{\beta}\right)^2$ is

(*a*) $\frac{-9}{4}$ (*b*) $\frac{7}{4}$ (*c*) $\frac{9}{4}$ (*d*) $\frac{-7}{4}$

31. If α and β are the zeroes of the polynomial $x^2 - (k + 6)x + 2(2k - 1)$ and $\alpha + \beta = \frac{\alpha\beta}{2}$ then

(*a*) $k = 6$ (*b*) $k = 2$ (*c*) $k = 14$ (*d*) $k = 7$

32. If α and β are the zeroes of the quadratic polynomial $kx^2 + 4x + 4$ and $(\alpha + \beta)^2 - 2\alpha\beta = 24$, then

(*a*) $k = 1, \frac{-2}{3}$ (*b*) $k = -1, \frac{2}{3}$ (*c*) $k = \frac{1}{3}$, 1 (*d*) $k = -\frac{1}{3}, \frac{2}{3}$

33. If one of the zeroes of the cubic polynomial $ax^3 + bx^2 + cx + d$ is zero, then the product of the other two zeroes is

(*a*) 0 (*b*) $\frac{b}{a}$ (*c*) $\frac{-c}{a}$ (*d*) $\frac{c}{a}$

34. If the zeroes of the polynomial $x^3 - 12x^2 + 44x + c$ are in AP, then the value of c is

(*a*) 44 (*b*) 48 (*c*) -44 (*d*) -48

35. If $a - b$, a and $a + b$ are zeroes of the polynomial $x^3 - 3x^2 + x + 1$, the value of $(a + b)$ is

(*a*) $-1 + \sqrt{2}$ (*b*) $-1 - \sqrt{2}$ (*c*) $1 \pm \sqrt{2}$ (*d*) 3

36. The condition to be satisfied by the coefficients of the polynomial $f(x) = x^3 - 2x^2 + qx - r$ when the sum of its two zeroes is zero, is

(*a*) $2r = q$ (*b*) $2q = r$ (*c*) $q = r$ (*d*) $4q = r$

37. For what value of k is the polynomial $p(x) = 2x^3 - kx^2 + 5x + 9$ exactly divisible by $x + 2$?

(*a*) $\frac{17}{4}$ (*b*) $\frac{-17}{4}$ (*c*) $\frac{-15}{4}$ (*d*) $\frac{15}{4}$

38. If α, β and γ are the zeroes of polynomials $kx^3 - 5x + 9$ and $\alpha^3 + \beta^3 + \gamma^3 = 27$, then

(*a*) $k = -3$ (*b*) $k = 3$ (*c*) $k = 1$ (*d*) $k = -1$

Chapter 3: Pair of Linear Equations in Two Variables

MULTIPLE-CHOICE QUESTIONS

For Basic and Standard Levels

Choose the correct answer from the given four options in the following questions:

1. If a pair of equations is consistent, then the lines will be

(*a*) always intersecting. (*b*) always coincident.

(*c*) intersecting or coincident. (*d*) parallel.

2. The pair of equations $x = 4$ and $y = 3$ graphically represent lines which are

(*a*) coincident. (*b*) parallel.

(*c*) intersecting at (3, 4). (*d*) intersecting at (4, 3). **[CBSE 2012]**

3. One equation of a pair of dependent linear equations is $-5x + 7y = 2$, the second equation can be

(*a*) $10x + 14y + 4 = 0$ (*b*) $-10x - 14y + 4 = 0$

(*c*) $-10x + 14y + 4 = 0$ (*d*) $10x - 14y = -4$ **[CBSE SP 2011]**

4. The value of α for which the pair of equations $3x + \alpha y = 6$ and $6x + 8y = 7$ will have infinitely many solutions is

(*a*) 4 (*b*) no value

(*c*) 3 (*d*) $\frac{1}{2}$

5. The points at which the graph lines of the equations $ax + by = 0$ and $ax - by = 0$ intersect is

(*a*) $(a, 0)$ (*b*) $(b, 0)$

(*c*) $(0, 0)$ (*d*) (a, b)

6. The points of intersection of the graph line of $\frac{x}{a} + \frac{y}{b} - 2 = 0$ with the x-axis and y-axis respectively are

(*a*) $(0, -2a), (-2b, 0)$ (*b*) $(-2a, 0), (0, -2b)$

(*c*) $(0, 2a), (2b, 0)$ (*d*) $(2a, 0), (0, 2b)$

7. Which of the following is not a solution of the pair of equations $3x - 2y = 4$ and $6x - 4y = 8$?

(*a*) $x = 2, y = 1$ (*b*) $x = 4, y = 4$

(*c*) $x = 6, y = 7$ (*d*) $x = 5, y = 3$ **[CBSE SP 2011]**

8. If $x = a$, $y = b$ is the solution of the equations $x - y = 2$, $x + y = 4$, then the values of a and b are respectively

(a) 3 and 5 (b) 5 and 3

(c) 3 and 1 (d) –1 and –3

9. The value of x satisfying both the equations $4x - 5 = y$ and $2x - y = 3$, when $y = -1$ is

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

10. The x-coordinate of the point which lies on the line represented by $5x - y - 7 = 0$ and whose y-coordinate is 13 is

(a) 4 (b) 5 (c) 6 (d) 7

11. The pair of equations $x + y - 40 = 0$ and $x - 2y + 14 = 0$ have

(a) a unique solution (b) exactly two solutions

(c) infinitely many solutions (d) no solution

12. If (6, k) is a solution of the equation $3x + y - 22 = 0$, then the value of k is

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

13. The value of k for which the pair of linear equations $3kx + 6y = \sqrt{50}$ and $\sqrt{18}\,x + \sqrt{24}\,y = \sqrt{75}$ have a unique solution is

(a) $k \neq -6$ (b) $k \neq 6$

(c) $k \neq \sqrt{3}$ (d) $k \neq -3$.

14. If the pair of equations $2x + 3y = 7$ and $kx + \frac{9}{2}y = 12$ have no solution, then the value of k is

(a) $\frac{2}{3}$ (b) $\frac{3}{2}$ (c) 3 (d) -3

15. If the pair of equations $8x + 2y = 5k$ and $4x + y = 3$ represent coincident lines then

(a) $k = -\frac{5}{6}$ (b) $k = \frac{6}{5}$ (c) $k = \frac{5}{6}$ (d) $k = -\frac{6}{5}$

For Standard Level

16. If $\frac{2}{x} + \frac{3}{y} = 13$ and $\frac{5}{x} - \frac{4}{y} = -2$, then $x + y$ equals **[CBSE SP 2011]**

(a) $\frac{1}{6}$ (b) $\frac{-1}{6}$ (c) $\frac{5}{6}$ (d) $\frac{-5}{6}$

17. If $bx + ay = a^2 + b^2$ and $ax - by = 0$, then the value of $x - y$ is

(a) $a - b$ (b) $b - a$

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

18. If $\sqrt{a}x - \sqrt{b}y = b - a$ and $\sqrt{b}x - \sqrt{a}y = 0$, then xy is equal to

(a) $a + b$ (b) $a - b$

(c) $\sqrt{ab}$ (d) $-\sqrt{ab}$

19. The pair of linear equations $(3k + 1)x + 3y - 5 = 0$ and $2x - 3y + 5 = 0$ have infinite number of solutions. Then the value of k is

(a) 1 (b) 0 (c) 2 (d) –1 **[CBSE SP 2011]**

20. If the graph of the equations $3x + 4y = 12$ and $(m + n)x + 2(m - n)y = (5m - 1)$ is a coincident line, then

(a) $m = -1, n = -5$ (b) $m = 1, n = 5$

(c) $m = 5, n = 1$ (d) $m = -5, n = -1$

Chapter 4: Quadratic Equations

MULTIPLE-CHOICE QUESTIONS

For Basic and Standard Levels

Choose the correct answer from the given four options in the following questions:

1. Which one of the following is a quadratic equation?

(*a*) $(a+1)x^2 - \frac{3}{5}x = 11$, where $a = -1$ (*b*) $(3-x)^2 - 5 = x^2 + 2x + 1$

(*c*) $8x^3 - x^2 = (2x-1)^3$ (*d*) $-3x^2 = (2-x)\left(3x - \frac{1}{2}\right)$

2. Which of the following equation has 3 as a root?

(*a*) $2x^2 - x - 6 = 0$ (*b*) $2x^2 - 5x - 3 = 0$

(*c*) $6x^2 - x - 2 = 0$ (*d*) $8x^2 - 22x - 21 = 0$

3. Which of the following is a solution of quadratic equation $x^2 - b^2 = a(2x - a)$?

(*a*) $a + b$ (*b*) $2b - a$ (*c*) ab (*d*) $\frac{a}{b}$ **[CBSE SP 2012]**

4. The roots of the quadratic equation $2x^2 - x - 6 = 0$ are

(*a*) $-2, \frac{3}{2}$ (*b*) $2, \frac{-3}{2}$ (*c*) $-2, \frac{-3}{2}$ (*d*) $2, \frac{3}{2}$

[CBSE SP 2012]

5. The roots of the quadratic equation $x^2 - 3x - m(m+3) = 0$, where m is a constant, are

(*a*) $m, m+3$ (*b*) $-m, m+3$

(*c*) $m, -(m+3)$ (*d*) $-m, -(m+3)$ **[CBSE 2011]**

6. If one root of the equation $2x^2 + kx - 6 = 0$ is 2, then the value of $k + 1$ is

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

7. The quadratic equation $2y^2 - \sqrt{3}y + 1 = 0$ has

(*a*) more than two real roots (*b*) two equal real roots

(*c*) no real roots (*d*) two distinct real roots

8. Which one of the following equations has two distinct roots?

(*a*) $x^2 + 2x - 7 = 0$ (*b*) $3y^2 - 3\sqrt{3}y + \frac{9}{4} = 0$

(*c*) $x^2 + 2x + 2\sqrt{3} = 0$ (*d*) $6x^2 - 3x + 1 = 0$

9. Which one of the following equations has no real roots?

(*a*) $x^2 - 2x - 2\sqrt{3} = 0$ (*b*) $x^2 - 4x + 4\sqrt{2} = 0$

(*c*) $3x^2 + 4\sqrt{3}x + 3 = 0$ (*d*) $x^2 + 4x - 2\sqrt{2} = 0$

10. $(x^2 + 2)^2 - x^2 = 0$ has

(*a*) four real roots (*b*) two real roots

(*c*) one real root (*d*) no real roots

11. If the equation $x^2 + 4x + k = 0$ has real and distinct roots, then

(*a*) $k \le 4$ (*b*) $k < 4$ (*c*) $k > 4$ (*d*) $k \ge 4$

12. The quadratic equation $49x^2 + 21x + \frac{9}{4} = 0$ has

(*a*) real and equal roots (*b*) four real roots

(*c*) real and unequal roots (*d*) no real roots

13. The positive value of k for which the equations $x^2 + kx + 64 = 0$ and $x^2 - 8x + k = 0$ will both have real roots, is

(*a*) 8 (*b*) 4 (*c*) 12 (*d*) 16

14. Value(s) of p for which $2x^2 - px + p = 0$ has equal roots is/are

(*a*) 0, 8 (*b*) 8 only (*c*) 4 only (*d*) 0 only

15. If the equation $25x^2 - kx + 9 = 0$ has equal roots, then

(*a*) $k = \pm 30$ (*b*) $k = \pm 25$

(*c*) $k = \pm 9$ (*d*) $k = \pm 34$

16. If the equation $x^2 - 4x + k = 0$ has coincident roots, then

(*a*) $k = -4$ (*b*) $k = 4$ (*c*) $k = 0$ (*d*) $k = -2$

17. If the equation $ax^2 + bx + c = 0$ has equal roots, then the value of c is

(*a*) $\frac{b^2}{4a}$ (*b*) $\frac{b}{2a}$ (*c*) $\frac{-b}{2a}$ (*d*) $\frac{-b^2}{4a}$

18. If the quadratic equation $mx^2 + 2x + m = 0$ has equal roots then the values of m are

(*a*) ± 1 (*b*) 0, 2 (*c*) 0, 1 (*d*) $-1, 0$ **[CBSE 2012]**

19. If one root of $4x^2 - 2x + (k - 4) = 0$ be the reciprocal of the other, then

(*a*) $k = -8$ (*b*) $k = 8$ (*c*) $k = 4$ (*d*) $k = -4$

20. Which of the following has the sum of its roots as 3 ?

(*a*) $x^2 + 3x - 5 = 0$ (*b*) $-x^2 + 3x + 3 = 0$

(*c*) $\sqrt{2}x^2 - \frac{3}{\sqrt{2}}x - 1 = 0$ (*d*) $3x^2 - 3x - 3 = 0$ **[CBSE SP 2011]**

21. If 1 is a root of the equations $ay^2 + ay + 3 = 0$ and $y^2 + y + b = 0$, then ab equals

(*a*) 3 (*b*) $\frac{-7}{2}$ (*c*) 6 (*d*) -3 **[CBSE SP 2012]**

22. If $x = 1$ is a common root of $ax^2 + ax + 2 = 0$ and $x^2 + x + b = 0$, then $a : b$ is equal to

(*a*) 1 : 2 (*b*) 2 : 1 (*c*) 1 : 4 (*d*) 4 : 1

23. If one root of $x^2 + px + 3 = 0$ is 1, then

(*a*) $p = -3$ (*b*) $p = 3$ (*c*) $p = -4$ (*d*) $p = 4$

24. The condition so that the roots of the quadratic equation $ax^2 + bx + c = 0$, $a \neq 0$, may be equal in magnitude but opposite in sign, is

(*a*) $a = -1$ (*b*) $c = 0$ (*c*) $a = 0$ (*d*) $b = 0$

25. If 2 is a root of the quadratic equation $x^2 + ax + 12 = 0$ and the quadratic equation $x^2 + ax + q = 0$ has equal roots then

(*a*) $q = 12$ (*b*) $q = 8$ (*c*) $q = 20$ (*d*) $q = 16$

26. Which constant must be added and subtracted to solve the quadratic equation $a^2x^2 - 3abx + 2b^2 = 0$ by the method of completing the square?

(*a*) $\frac{4b^2}{9a^2}$ (*b*) $\frac{4a^2}{3b^2}$ (*c*) $\frac{9b^2}{4a^2}$ (*d*) $\frac{3b^2}{4a^2}$

27. If $x = -2$ and $x = \frac{3}{4}$ are solutions of the equation $px^2 + qx - 6 = 0$, then the values of p and q are respectively

(*a*) 1, 6 (*b*) 5, 4 (*c*) 4, 5 (*d*) 6, 1

For Standard Level

28. The ratio of sum and products of the roots of the equation $3x^2 + 12 - 13x = 0$ is

(*a*) 12 : 13 (*b*) 13 : 12 (*c*) 6 : 7 (*d*) 7 : 6

29. If the sum of the roots of the quadratic equation $kx^2 + 6x + 4k = 0$ is equal to the product of its roots, then

(*a*) $k = \frac{-3}{2}$ (*b*) $k = \frac{3}{2}$ (*c*) $k = \frac{2}{3}$ (*d*) $k = \frac{-2}{3}$

30. If one root of $3x^2 = 8x + (2k + 1)$is seven times the other, then the roots are

(*a*) $-3, -\frac{3}{7}$ (*b*) $\frac{1}{3}, \frac{7}{3}$ (*c*) $-\frac{1}{3}, -\frac{7}{3}$ (*d*) $3, \frac{3}{7}$

31. A quadratic equation whose one root is $1 + \sqrt{2}$ and the sum of its roots is 2, is

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

32. A quadratic equation with rational coefficients and one root as $4 + \sqrt{3}$ is

(*a*) $x^2 + 8x + 13 = 0$ (*b*) $x^2 - 8x + 13 = 0$

(*c*) $x^2 + 8x - 13 = 0$ (*d*) $x^2 - 8x - 13 = 0$

33. If $(a^2 + b^2)x^2 + 2(ac + bd)x + (c^2 + d^2) = 0$ has no real roots, then

(*a*) $ad = bc$ (*b*) $ab = cd$ (*c*) $ac = bd$ (*d*) $ad \neq bc$

34. If the roots of the equation $x^2 - 2x(1 + 3k) + 7(3 + 2k) = 0$ are real and equal, then

(*a*) $k = 2, \frac{-10}{9}$ (*b*) $k = -2, \frac{10}{9}$ (*c*) $k = 9, \frac{1}{10}$ (*d*) $k = -9, \frac{-1}{10}$

35. If one root of the quadratic equation $ax^2 + bx + c = 0$ is three times the other, then

(*a*) $b^2 = 16ac$ (*b*) $b^2 = 3ac$ (*c*) $3b^2 = 16ac$ (*d*) $16b^2 = 3ac$

36. If sin α and cos α are the roots of the equation $ax^2 + bx + c = 0$, then

(*a*) $a^2 - 2ac = b^2$ (*b*) $a^2 + 2ac = b^2$ (*c*) $a^2 - ac = b^2$ (*d*) $a^2 + ac = b^2$

37. If one root of the equation $4x^2 - 8kx - 9 = 0$ is negative of the other, then

(*a*) $k = 9$ (*b*) $k = 0$ (*c*) $k = 8$ (*d*) $k = 4$

38. Quadratic equation whose roots are $\frac{2+\sqrt{5}}{2}, \frac{2-\sqrt{5}}{2}$ is

(*a*) $8x^2 - 4x - 1 = 0$ (*b*) $4x^2 + 8x + 1 = 0$

(*c*) $4x^2 + 8x - 1 = 0$ (*d*) $4x^2 - 8x - 1 = 0$

39. If the sum of the roots of the equation $x^2 - (k + 6)x + 2(2k - 1) = 0$ is equal to half their product, then

(*a*) $k = 6$ (*b*) $k = 7$ (*c*) $k = 1$ (*d*) $k = 5$

40. Quadratic equation whose roots are the reciprocal of the roots of the equation $ax^2 + bx + c = 0$ is

(*a*) $ax^2 + cx + b = 0$ (*b*) $cx^2 + bx + a = 0$

(*c*) $cx^2 - bx + a = 0$ (*d*) $cx^2 + bx - a = 0$

41. Which constant must be added and subtracted to solve the quadratic equation $5x^2 - 6x - 2 = 0$ by the method of completing the square?

(*a*) $\frac{3}{5}$ (*b*) $\frac{36}{25}$ (*c*) $\frac{25}{36}$ (*d*) $\frac{9}{25}$

42. If two numbers m and n are such that the quadratic equation $mx^2 + 3x + 2n = 0$ has – 6 as the sum of the roots and also as the product of roots then

(*a*) $m = \frac{1}{2}, n = \frac{-3}{2}$ (*b*) $m = \frac{-3}{2}, n = \frac{1}{2}$

(*c*) $m = \frac{2}{3}, n = \frac{-1}{2}$ (*d*) $m = \frac{-2}{3}, n = \frac{3}{2}$

43. The value of y which satisfies the equation $1 + \frac{y^2}{13} = \sqrt{\frac{27}{169} + 1}$ is

(*a*) ± 2 (*b*) ± 1 (*c*) ± 3 (*d*) ± 4

44. If $x = \sqrt{6 + \sqrt{6 + \sqrt{6...}}}$, then the value of x is

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

Chapter 5: **Arithmetic Progressions**

MULTIPLE-CHOICE QUESTIONS

For Basic and Standard Levels

Choose the correct answer from the given four options in the following questions:

1. The next term of the AP: $\sqrt{18}, \sqrt{50}, \sqrt{98}$ … is

(*a*) $\sqrt{146}$ (*b*) $\sqrt{128}$ (*c*) $\sqrt{162}$ (*d*) $\sqrt{200}$

[CBSE SP 2012]

2. The tenth term of the AP: –1.0, –1.5, –2.0, … is

(*a*) 3.5 (*b*) – 5.5 (*c*) 5.5 (*d*) – 6.5

[CBSE SP 2012]

3. The *n*th term of the AP: 7, 4, 1, – 2, … is

(*a*) $3 + 10n$ (*b*) $3 - 10n$ (*c*) $10 + 3n$ (*d*) $10 - 3n$

4. The 11th term of the AP: $-5, -\frac{5}{2}, 0, \frac{5}{2}, \ldots$ is

(*a*) – 20 (*b*) 30 (*c*) 20 (*d*) – 30

5. The 11th term of the sequence defined by $a_n = (-1)^{n-1} n^3$ is

(*a*) 1220 (*b*) 1221 (*c*) 1331 (*d*) 1330

6. The 12th term of an AP whose first two terms are – 3 and 4 is

(*a*) 67 (*b*) 74 (*c*) 60 (*d*) 81

7. If the first term of an AP is – 7 and its common difference is 5, then its 18th term will be

(*a*) 64 (*b*) 71 (*c*) 78 (*d*) 85

8. In an AP if $d = -\frac{1}{4}$, $n = 31$, $a_n = \frac{1}{2}$ then a is

(*a*) 6 (*b*) 8 (*c*) 10 (*d*) 12

9. In an AP if $a = -2.5$, $d = 0$, $n = 107$ then a_n will be

(*a*) – 3.5 (*b*) – 2.5 (*c*) 2.5 (*d*) 1.5

10. The 7th term from the end of the AP: 7, 11, 15, … , 107 is

(*a*) 79 (*b*) 83 (*c*) 81 (*d*) 87

11. If the common difference of an AP is 5, then $a_{15} - a_{11}$ is equal to

(*a*) 12 (*b*) 15 (*c*) 4 (*d*) 20

12. If $a_{20} - a_{12} = -32$, then the common difference of the AP is

(*a*) 4 (*b*) – 4 (*c*) – 3 (*d*) 3

13. The list of numbers – 5, – 1, 3, 7… is

(*a*) an AP with $d = -4$ (*b*) an AP with $d = 2$

(*c*) an AP with $d = 4$ (*d*) not an AP

14. The first four terms of an AP, whose first term is 0.3 and the common difference is 0.25, are

(*a*) 0.3, 0.8, 1.3, 1.8 (*b*) 0.3, 0.55, 0.80, 1.05

(*c*) 0.3, 1.05, 1.80, 2.55 (*d*) 0.3, 0.5, 0.7, 0.9

15. The number of *ds* added to the first term of an AP to get its 29th term is

(*a*) 29 (*b*) 28 (*c*) 27 (*d*) 30

16. How many terms are there in the AP: 3, 6, 9, 12, … , 111?

(*a*) 35 (*b*) 36 (*c*) 38 (*d*) 37

17. If $x = 1000$ is the kth term of the AP: 25, 50, 75, 100 … then

(*a*) $k = 40$ (*b*) $k = 25$ (*c*) $k = 39$ (*d*) $k = 50$

18. If $a = 5$, $l = 45$ and $S_n = 400$ then n is equal to

(*a*) 15 (*b*) 80 (*c*) 50 (*d*) 16

19. The fourth term of an AP is equal to 3 times its first term and its seventh term exceeds twice the third term by 1. Then, the first term is

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

20. The common difference of the AP $\frac{1}{p}, \frac{1-p}{p}, \frac{1-2p}{p}$, is

(*a*) p (*b*) $-p$ (*c*) -1 (*d*) 1 **[CBSE SP 2013]**

21. How many terms of two digits are divisible by 3?

(*a*) 29 (*b*) 31 (*c*) 30 (*d*) 28

22. The nth term of an AP whose sum of n terms is S_n, is

(*a*) $S_n + S_{n+1}$ (*b*) $S_n - S_{n-1}$ (*c*) $S_n + S_{n-1}$ (*d*) $S_n - S_{n+1}$

23. The first four terms of the sequence whose nth term is given by $a_n = \frac{4n+1}{2}$, are

(*a*) $1, \frac{3}{2}, \frac{5}{2}, \frac{7}{2}$ (*b*) $\frac{5}{2}, \frac{9}{2}, \frac{13}{2}, \frac{17}{2}$

(*c*) $\frac{1}{2}, 2, 3, 5$ (*d*) $\frac{3}{2}, \frac{7}{2}, \frac{11}{2}, \frac{15}{2}$

24. If the nth term of an AP is $6n + 2$, then its common difference is

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

25. If k, $2k - 1$ and $2k + 1$ are three consecutive terms of an AP, the value of k is

(*a*) 2 (*b*) 3 (*c*) –3 (*d*) 5 **[CBSE 2014]**

26. If $a = -2$, $d = 0$, then the first four terms of the AP are

(*a*) – 2, – 4, – 6, – 8 (*b*) – 2, – 2, – 2, – 2

(*c*) – 2, 1, 4, 7 (*d*) – 2, 0, 2, 4

27. The famous mathematician associated with finding the sum of first 100 natural numbers is

(*a*) Euclid (*b*) Newton

(*c*) Gauss (*d*) Pythagoras

28. If 5 times the 5th term of an AP is equal to 10 times its 10th term, then its 15th term will be

(*a*) 11 (*b*) 7 (*c*) 0 (*d*) 18

29. Which term of the progression $19, 18\frac{1}{5}, 17\frac{2}{5}, \ldots$ is the first negative term?

(*a*) 24th term (*b*) 26th term (*c*) 25th term (*d*) 23rd term

30. If the 7th term of an AP is 32 and its 13th term is 62, then the AP is

(*a*) 62, 67, 72, … (*b*) 2, 7, 12, …

(*c*) 32, 37, 42, … (*d*) 1, 6, 11, …

31. Which term of the AP: 3, 10, 17, … will be 84 more than its 13th term?

(*a*) 24th term (*b*) 23rd term

(*c*) 25th term (*d*) 27th term

32. The sum of first five terms of the AP: 3, 7, 11, 15, … is

(*a*) 44 (*b*) 55 (*c*) 22 (*d*) 11

33. If the first term of an AP is 1 and the common difference is 2, then the sum of first 26 terms is

(*a*) 484 (*b*) 576 (*c*) 676 (*d*) 625

34. If the last term of an AP is 119 and the 8th term from the end is 91, then the common difference of the AP is

(*a*) – 3 (*b*) 4 (*c*) 3 (*d*) 2

35. If the sum to n terms of an AP is $3n^2 + 4n$, then the common difference of the AP is

(*a*) 7 (*b*) 5 (*c*) 8 (*d*) 6

36. If a_p be the pth term of AP: 3, 15, 27, … and $a_p - a_{50} = 180$, then

(*a*) $p = 68$ (*b*) $p = 65$ (*c*) $p = 66$ (*d*) $p = 67$

37. If the 19th term of an AP exceeds the 12th term of the AP by $\frac{7}{4}$, then the common difference is

(*a*) $\frac{7}{4}$ (*b*) $\frac{1}{4}$ (*c*) $\frac{3}{4}$ (*d*) $\frac{5}{4}$

38. In an AP: $a_1, a_2, \ldots, a_n$ if $a_1 = 21$, $a_2 = 42$, $a_n = 420$ then

(*a*) $n = 18$ (*b*) $n = 19$ (*c*) $n = 21$ (*d*) $n = 20$

39. The nth term of an AP whose sum is given by $S_n = \frac{5n^2}{2} + \frac{3n}{2}$, will be

(*a*) $6n - 1$ (*b*) $7n - 1$ (*c*) $5n + 1$ (*d*) $5n - 1$

40. The sum of 4th and 8th terms of an AP is 24 and the sum of 6th and the 10th term is 44, then the 3rd term is

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

For Standard Level

41. Two APs have the same common difference. The first term of one of these is 8 and that of the other is 3. The difference between their 30th terms is

(*a*) 11 (*b*) 3 (*c*) 8 (*d*) 5

42. The expression for the common difference of an AP whose first term is a and nth term is b is

(*a*) $\frac{b-a}{n+1}$ (*b*) $\frac{b+a}{n-1}$ (*c*) $\frac{b-a}{n-1}$ (*d*) $\frac{b+a}{n+1}$

43. The sum of first 21 terms of the AP whose 2nd term is 8 and 4th term is 14 is

(*a*) 855 (*b*) 735 (*c*) 1035 (*d*) 925

44. If four numbers are in AP such that their sum is 32 and the least number is one-seventh the greatest number, then the numbers are

(*a*) 1, 3, 5, 7 (*b*) 6, 18, 30, 42 (*c*) 4, 12, 20, 28 (*d*) 2, 6, 10, 14

45. If $4k + 8$, $2k^2 + 3k + 6$ and $3k^2 + 4k + 4$ are three consecutive terms of an AP then

(*a*) $k = 2, 1$ (*b*) $k = 0, 2$ (*c*) $k = 0, 1$ (*d*) $k = 1, 2$

46. The 25th term of an AP whose 9th term is -6 and the common difference is $\frac{5}{4}$ is

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

47. The first, second and last term of an AP are respectively 4, 7 and 31. How many terms are there in the given AP?

(*a*) 12 (*b*) 10 (*c*) 13 (*d*) 9

48. If the ratio of 18th term to the 11th term of an AP is 3 : 2, then the ratio of the 21st term to the 5th term is

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

49. The sum of n terms of the series $\sqrt{3} + \sqrt{12} + \sqrt{27} + \sqrt{48} + \ldots$ is

(*a*) $\frac{2n(n+1)}{\sqrt{3}}$ (*b*) $\frac{\sqrt{3}n\,(n-1)}{2}$ (*c*) $\frac{\sqrt{3}n\,(n+1)}{2}$ (*d*) $\frac{2n\,(n-1)}{\sqrt{3}}$

50. The sum of three consecutive terms of an increasing AP is 21 and the product of the first and the third of these terms is 45, then the third term is

(*a*) 5 (*b*) 9 (*c*) 4 (*d*) 2

51. If the nth term of an AP is $(2n + 1)$, then the sum of first n terms of the AP is

(*a*) $n(n-2)$ (*b*) $n(n+2)$ (*c*) $n(n+1)$ (*d*) $n(n-1)$

52. The sum of all two digit odd positive numbers is

(*a*) 2275 (*b*) 2450 (*c*) 2250 (*d*) 2475

53. The sum of all two digit positive numbers divisible by 3 is

(*a*) 1560 (*b*) 1665 (*c*) 1656 (*d*) 1655

54. The sum of first 51 terms of the AP whose 2nd term is 2 and 4th term is 8, is

(*a*) 4374 (*b*) 3774 (*c*) 3477 (*d*) 3747

55. $\left(3-\frac{1}{n}\right)+\left(3-\frac{2}{n}\right)+\left(3-\frac{3}{n}\right)+\ldots$ up to n is

(*a*) $\frac{3n-1}{2}$ (*b*) $\frac{3n+1}{2}$ (*c*) $\frac{5n-1}{2}$ (*d*) $\frac{5n+1}{2}$

56. $-5+(-8)+(-11)+\ldots+(-230)=?$

(*a*) -8930 (*b*) -8925 (*c*) -8935 (*d*) -8940

57. If the sum of an AP is $3n^2 - n$, then its first term is

(*a*) 3 (*b*) 4 (*c*) 2 (*d*) 0

58. If the sum of first seven terms of an AP is 49 and that of 17 terms is 289, then the sum of first n terms is

(*a*) $\frac{n^2+1}{2}$ (*b*) $\frac{n(n+1)}{2}$ (*c*) $2n$ (*d*) n^2

59. If $5 + 7 + 9 + \ldots + x = 320$, then x is equal to

(*a*) 33 (*b*) 35 (*c*) 37 (*d*) 39

60. If each term of an AP is increased by constant k then the nth term of the resulting AP is

(*a*) $(a + k) + nd$ (*b*) $(a + k + 1) + nd$

(*c*) $(a + k - 1) + nd$ (*d*) $(a + k) + (n - 1)d$

61. If the sum of first nine terms of an AP is 171 and that of first 24 terms is 996, then the AP is

(*a*) 7, 10, 13… (*b*) 8, 10, 12…

(*c*) 9, 11, 13… (*d*) 10, 15, 20…

62. The sum of first 24 terms of the sequence whose nth term is given by $a_n = 3+\frac{2}{3}n$ is

(*a*) 384 (*b*) 382 (*c*) 272 (*d*) 270

63. Four numbers are in AP. If their sum is 20 and the sum of their squares is 120, then, the numbers are

(*a*) $-10, 0, 10, 20$ (*b*) 1, 3, 5, 7

(*c*) 2, 4, 6, 8 (*d*) $-1, 3, 7, 11$

64. The number of terms of the AP: 63, 60, 57, … so that the sum is 693 is

(*a*) 21, 22 (*b*) 23 (*c*) 20 (*d*) 24

65. If the three terms in AP are such that their product is 336 and the sum is 21, then the numbers are

(*a*) 4, 7, 10 (*b*) 2, 7, 12

(*c*) 6, 7, 8 (*d*) 5, 7, 9

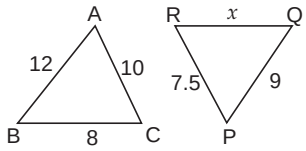
Chapter 6: **Triangles**

MULTIPLE-CHOICE QUESTIONS

For Basic and Standard Levels

Choose the correct answer from the given four options in the following questions:

1. If $\Delta ABC \sim \Delta PQR$, then x is equal to



(*a*) $\frac{8}{3}$ (*b*) 6

(*c*) 4 (*d*) $\frac{16}{3}$

2. If $\Delta PQR \sim \Delta XYZ$, $\angle Q = 50°$ and $\angle R = 70°$, then $\angle X + \angle Y$ is equal to

(*a*) 70° (*b*) 110°

(*c*) 120° (*d*) 50° **[CBSE 2011]**

3. If in ΔABC and ΔDEF, $\frac{AB}{DE} = \frac{BC}{FD}$, then they will be similar, when

(*a*) $\angle A = \angle F$ (*b*) $\angle A = \angle D$

(*c*) $\angle B = \angle D$ (*d*) $\angle B = \angle E$ **[CBSE SP 2011]**

4. It is given that $\Delta ABC \sim \Delta DFE$, $\angle A = 30°$, $\angle C = 40°$, AB = 5 cm, AC = 8 cm and DF = 7.5 cm. Then, the following is true.

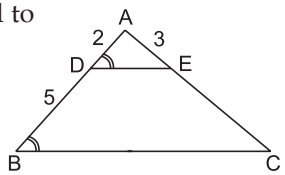
(*a*) $\angle F = 40°$, DE = 12 cm

(*b*) $\angle F = 110°$, DE = 12 cm

(*c*) $\angle D = 30°$, EF = 12 cm

(*d*) $\angle D = 110°$, EF = 12 cm

5. In the given figure, if $\angle ADE = \angle ABC$ then CE is equal to



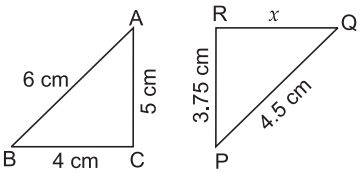
(*a*) 10 cm

(*b*) 7 cm

(*c*) 7.5 cm

(*d*) 10.5 cm

6. $\Delta ABC \sim \Delta PQR$. The value of x is



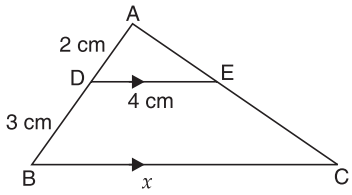
(*a*) 2.5 cm

(*b*) 3 cm

(*c*) 2.75 cm

(*d*) 3.5 cm

7. In the given figure DE || BC, then x equals



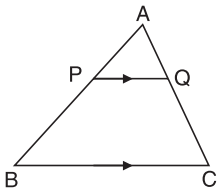
(*a*) 6 cm

(*b*) 8 cm

(*c*) 12 cm

(*d*) 10 cm **[CBSE SP 2011]**

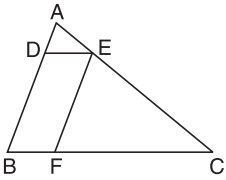
8. In the adjoining figure, P and Q are points on the sides AB and AC respectively of ΔABC such that AP = 3.5 cm, PB = 7 cm, AQ = 3 cm, QC = 6 cm and PQ = 4.5 cm. The measure of BC is equal to



(*a*) 13.5 cm (*b*) 9 cm

(*c*) 12.5 cm (*d*) 15 cm **[CBSE 2008]**

9. In the given figure, AD : DB = 1 : 3, AE : EC = 1 : 3 and BF : FC = 1 : 4, then



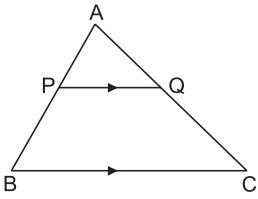
(*a*) DE || BC

(*b*) AD || FC

(*c*) AE || DC

(*d*) CE || BD

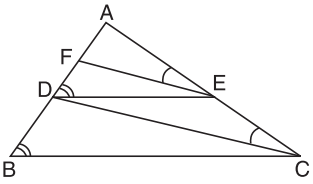
10. In the given figure, PQ || BC. If $\frac{AP}{PB} = \frac{AQ}{QC} = \frac{1}{2}$, then



(*a*) PQ = BC (*b*) $PQ^2 = BC^2$

(*c*) $PQ = \frac{BC}{3}$ (*d*) $PQ = \frac{BC}{2}$

11. In the given figure, ∠ADC = ∠ABC, ∠AEF = ∠ACD, AF = 1 unit, AE = 4 units and EC = 8 units, then AF : DB equals



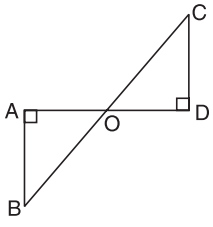
(*a*) 1 : 3

(*b*) 1 : 6

(*c*) 1 : 2

(*d*) 1 : 8

12. In the given figure, ΔABO ~ ΔDCO. If CD = 2 cm, AB = 3 cm, OC = 3.2 cm, OD = 2.4 cm, then



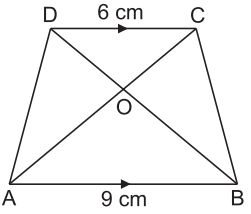
(*a*) OA = 3 cm, OB = 4 cm

(*b*) OA = 3.2 cm, OB = 4.6 cm

(*c*) OA = 4.3 cm, OB = 3.5 cm

(*d*) OA = 3.6 cm, OB = 4.8 cm

13. In trapezium ABCD, if AB || DC, AB = 9 cm, DC = 6 cm and BD = 12 cm, then BO is equal to



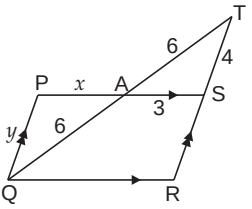
(*a*) 7.4 cm

(*b*) 7 cm

(*c*) 7.2 cm

(*d*) 7.5 cm

14. In the given figure, if AT = AQ = 6, AS = 3, TS = 4, then



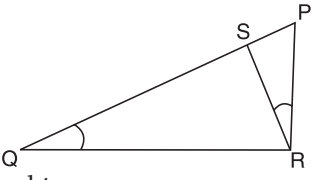
(*a*) $x = 4, y = 5$

(*b*) $x = 2, y = 3$

(*c*) $x = 1, y = 2$

(*d*) $x = 3, y = 4$

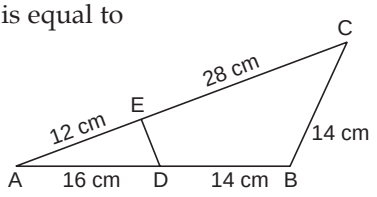
15. In the adjoining figure, $\angle PQR = \angle PRS$. If PR = 8 cm, PS = 4 cm, then PQ is equal to



(*a*) 12 cm (*b*) 16 cm

(*c*) 32 cm (*d*) 24 cm

16. In the given figure, if $\Delta AED \sim \Delta ABC$, then DE is equal to



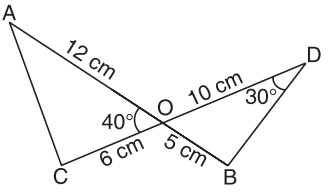
(*a*) 5.5 cm

(*b*) 6.5 cm

(*c*) 7.5 cm

(*d*) 5.6 cm

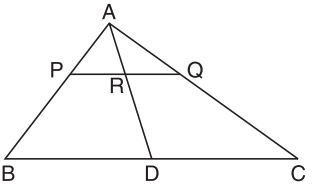
17. In the given figure, two line segments AB and CD intersect each other at the point O such that OA = 12 cm, OD = 10 cm, OB = 5 cm, OC = 6 cm, $\angle AOC = 40°$ and $\angle BDO = 30°$. Then, $\angle OCA$ is equal to



(*a*) 120° (*b*) 100°

(*c*) 90° (*d*) 110°

18. In the given figure, if AP = 3 cm, AR = 4.5 cm, AQ = 6 cm, AB = 5 cm and AC = 10 cm, then AD is equal to



(*a*) 5.7 cm

(*b*) 7.6 cm

(*c*) 5.5 cm

(*d*) 7.5 cm

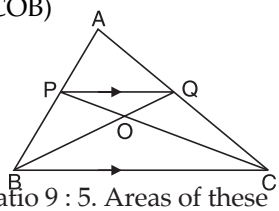
19. $\Delta PQR \sim \Delta XYZ$. If XY = 4 cm, YZ = 4.5 cm and ZX = 6.5 cm, PQ = 8 cm, then perimeter of ΔPQR is

(*a*) 25 cm (*b*) 23 cm (*c*) 15 cm (*d*) 30 cm

20. If $\Delta ABC \sim \Delta DEF$ and $EF = \frac{1}{3} BC$, then ar(ΔABC) : ar(ΔDEF) is

(*a*) 1 : 9 (*b*) 1 : 3 (*c*) 9 : 1 (*d*) 3 : 1

21. In the given figure, if PQ || BC and $\frac{AP}{PB}=\frac{3}{2}$, then $\frac{ar(\Delta POQ)}{ar(\Delta COB)}$ is



(*a*) $\frac{25}{9}$ (*b*) $\frac{4}{9}$

(*c*) $\frac{9}{4}$ (*d*) $\frac{9}{25}$

22. Corresponding sides of two similar triangles are in the ratio 9 : 5. Areas of these triangles are in the ratio

(*a*) 21 : 85 (*b*) 81 : 25 (*c*) 9 : 5 (*d*) 5 : 9

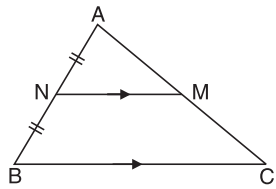
23. The areas of two similar triangles are 100 cm^2 and 49 cm^2. If the altitude of the larger triangle is 5 cm, then the corresponding altitude of the smaller triangle is equal to

(*a*) 3.9 cm (*b*) 4.5 cm (*c*) 3.5 cm (*d*) 5.4 cm

24. The areas of two similar traingles are 121 cm^2 and 64 cm^2 respectively. If the median of the first triangle is 13.2 cm, then the corresponding median of the other triangle is equal to

(*a*) 11 cm (*b*) 9.6 cm (*c*) 11.1 cm (*d*) 8.1 cm

25. If N is the mid-point of AB, NM || BC and ar(Δ ABC) = 20 cm^2, then ar(Δ ANM) is equal to



(*a*) 4.5 cm^2

(*b*) 5.5 cm^2

(*c*) 4 cm^2

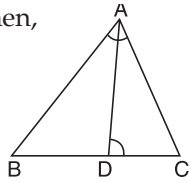
(*d*) 5 cm^2

26. ABC and BDE are two equilateral triangles such that D is the mid-point of BC. Ratio of areas of triangles ABC and BDE is

(*a*) 2 : 1 (*b*) 1 : 2

(*c*) 4 : 1 (*d*) 1 : 4 **[CBSE SP 2011]**

27. D is a point on side BC of ΔABC such that ∠ADC = ∠BAC. Then,



(*a*) $\frac{CA}{CD}=\frac{CB}{CA}$ (*b*) $\frac{AC}{AD}=\frac{AB}{CD}$

(*c*) $\frac{AB}{AC}=\frac{BC}{AD}$ (*d*) $\frac{AC}{BC}=\frac{AB}{AD}$

28. If a ladder is placed in such a way that its foot is at a distance of 12 m from the wall and its top reaches a window 9 m above the ground, then the length of the ladder is

(*a*) 24 m (*b*) 21 m (*c*) 15 m (*d*) 18 m

29. The length of the hypotenuse of an isosceles right triangle whose one side is $4\sqrt{2}$ cm is

(*a*) 12 cm (*b*) 8 cm

(*c*) $8\sqrt{2}$ cm (*d*) $12\sqrt{2}$ cm

30. The perimeter of an isosceles right triangle, the length of whose hypotenuse is 10 cm is

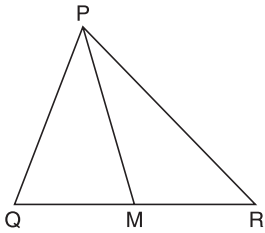
(*a*) $(10\sqrt{2} + 9)$ cm (*b*) $10(\sqrt{2}+1)$ cm

(*c*) 20 cm (*d*) $20\sqrt{2}$ cm

31. In ΔABC if AB = 4 cm, BC = 8 cm and AC = $4\sqrt{3}$ cm, then the measure of ∠A is

(*a*) 30° (*b*) 60° (*c*) 45° (*d*) 90°

32. In ΔPQR, if $\frac{PQ}{PR} = \frac{QM}{MR}$, ∠Q = 75° and ∠R = 45°, then the measure of ∠QPM is



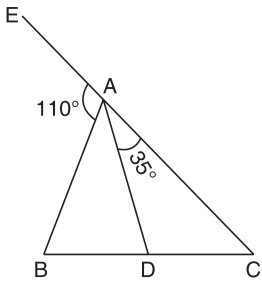
(*a*) 22.5°

(*b*) 30°

(*c*) 60°

(*d*) 45°

33. In the adjoining figure, if exterior ∠EAB = 110°, ∠CAD = 35°, AB = 5 cm, AC = 7 cm and BC = 3 cm, then CD is equal to



(*a*) 1.9 cm

(*b*) 2.25 cm

(*c*) 1.75 cm

(*d*) 2 cm

34. ABCD is a trapezium in which AB || DC and AB = 2DC. Diagonals AC and BD intersect at O. If ar(ΔAOB) = 84 cm^2, then ar(ΔCOD) is equal to

(*a*) 24 cm^2 (*b*) 28 cm^2 (*c*) 42 cm^2 (*d*) 21 cm^2

35. A vertical stick 30 m long casts a shadow 15 m long on the ground. At the same time, a tower casts a shadow 75 m long on the ground. The height of the tower is

(*a*) 150 m (*b*) 100 m (*c*) 25 m (*d*) 200 m

[CBSE SP 2012]

36. The length of an altitude of an equilateral triangle of side *a* is

(*a*) $\frac{2a}{\sqrt{3}}$ (*b*) $\frac{\sqrt{3}}{2a}$ (*c*) $\frac{a\sqrt{3}}{2}$ (*d*) $\frac{a}{2\sqrt{3}}$

[CBSE SP 2011]

37. If ΔABC ~ ΔPQR such that AB = 1.2 cm, PQ = 1.4 cm, then $\frac{ar(\Delta ABC)}{ar(\Delta PQR)}$ is

(*a*) $\frac{9}{49}$ (*b*) $\frac{3}{7}$ (*c*) $\frac{36}{49}$ (*d*) $\frac{6}{7}$

38. In ΔPQR, ∠Q = 90°, PQ = 5 cm, QR = 12 cm. If QS ⊥ PR, then QS is equal to

(*a*) $\frac{80}{13}$ cm (*b*) $\frac{13}{5}$ cm (*c*) $\frac{60}{13}$ cm (*d*) $\frac{12}{5}$ cm

39. In an equilateral triangle ABC, if AD ⊥ BC, then

(*a*) $3AB^2 = 2AD^2$ (*b*) $3AB^2 = 4AD^2$

(*c*) $4AB^2 = 3AD^2$ (*d*) $2AB^2 = 3AD^2$

40. The length of the second diagonal of a rhombus whose side is 5 cm and one of the diagonals is 8 cm is

(*a*) 14 cm (*b*) 6 cm (*c*) 12 cm (*d*) 10 cm

For Standard Level

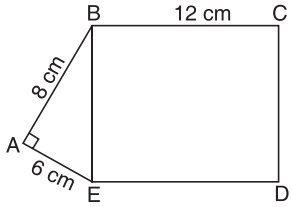
41. In the given figure, if AB = 8 cm, BC = 12 cm, AE = 6 cm then the area of rectangle BCDE is

(*a*) 48 cm^2

(*b*) 72 cm^2

(*c*) 96 cm^2

(*d*) 120 cm^2



42. A semicircle is drawn on AC. Two chords AB and BC of length 8 cm and 6 cm respectively are drawn in the semicircle. What is the measure of the diameter of the circle?

(*a*) 12 cm (*b*) 11 cm

(*c*) 10 cm (*d*) 14 cm

43. The area of a square inscribed in a circle of radius 8 cm is

(*a*) 64 cm^2 (*b*) 100 cm^2 (*c*) 120 cm^2 (*d*) 128 cm^2

[CBSE 2012]

44. The radii of two concentric circles are 15 cm and 17 cm, then the length of chord of one circle which is tangent to the other is

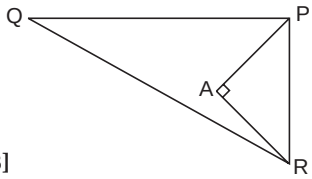
(*a*) 8 cm (*b*) 16 cm (*c*) 30 cm (*d*) 17 cm

[CBSE SP 2011]

45. In the given figure, if PQ = 24 cm, QR = 26 cm, ∠PAR = 90°, PA = 6 cm and AR = 8 cm, then ∠QPR is

(*a*) 30° (*b*) 90°

(*c*) 60° (*d*) 45° **[CBSE 2008]**



46. If D is a point on side BC of ΔABC such that BD = CD = AD, then

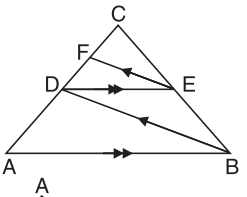
(*a*) $CD^2 + AD^2 = AC^2$

(*b*) $BD^2 + AD^2 = AB^2$

(*c*) $AB^2 + AC^2 = BC^2$

(*d*) $AB \cdot AC = AD^2$

47. In the given figure, AB || DE and BD || EF. Then,



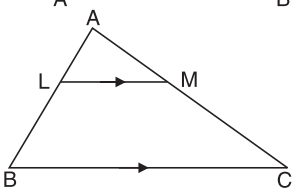
(*a*) $BC^2 = AB \cdot CE$

(*b*) $AB^2 = AC \cdot DE$

(*c*) $AC^2 = BC \cdot DC$

(*d*) $DC^2 = CF \cdot AC$

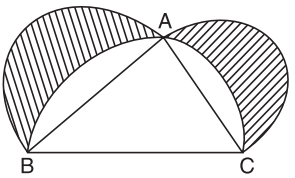
48. In the given figure, if $\frac{\text{ar}(\Delta ALM)}{\text{ar}(\text{trapezium LMCB})} = \frac{9}{16}$, then AL : LB is equal to



(*a*) 2 : 3 (*b*) 3 : 4

(*c*) 3 : 5 (*d*) 3 : 2

49. In the given figure ABC is a right-angled triangle right-angled at A. Semicircles are drawn on the sides of ΔABC. Then, the area of the shaded region is



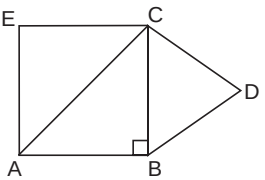
(*a*) $\frac{\text{ar}(\Delta ABC)}{2}$

(*b*) ar(ΔABC)

(*c*) $\frac{\text{ar(semicircle BAC)}}{2}$

(*d*) ar(semicircle BAC)

50. ABC is an isosceles triangle right-angled at B. Two equilateral triangles are constructed with side BC and AC as shown in figure. If ar(ΔACE) = 20 cm^2 then ar(ΔBCD) is



(*a*) 15 cm^2 (*b*) 12 cm^2

(*c*) 10 cm^2 (*d*) 16 cm^2

Chapter 7: Coordinate Geometry

MULTIPLE-CHOICE QUESTIONS

For Basic and Standard Levels

Choose the correct answer from the given four options in the following questions:

1. The measure of angle included between the lines represented by $x = 0$, $y = 0$ and the coordinates of the point of intersection of these lines are respectively

(*a*) 180°, (1, 1) (*b*) 90°, (0, 0) (*c*) 120°, (0, 1) (*d*) 60°, (1, 0)

2. $x = 5$ represents a line which is

(*a*) parallel to the *x*-axis (*b*) perpendicular to the *y*-axis

(*c*) parallel to the *y*-axis

(*d*) neither parallel nor perpendicular to the *x*-axis and the *y*-axis

3. If a line is drawn through (4, 6) parallel to the *x*-axis, then the distance of this line from the *x*-axis is

(*a*) 4 units (*b*) 6 units (*c*) 10 units (*d*) 2 units

4. The distance of the point (– 3, 4) from the *x*-axis is

(*a*) 3 units (*b*) – 3 units (*c*) 4 units (*d*) 5 units

[CBSE SP 2012]

5. The perpendicular distance of A(5, 12) from *y*-axis is

(*a*) 13 units (*b*) 5 units (*c*) 12 units (*d*) 17 units

[CBSE SP 2012]

6. The base QR of an equilateral triangle PQR with side 10 cm lies along *x*-axis such that the mid-point of the base is the origin. Then, the coordinates of the base QR are

(*a*) (0, – 5), (0, 5) (*b*) (–5, 0), (5, 0)

(*c*) (–5, 5), (0, 0) (*d*) (0, 5), (–5, 5)

7. The coordinates of the fourth vertex of the rectangle formed by (0, 0), (2, 0) and (0, 3) are

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

8. The distance between the points P(6, 0) and Q(–2, 0) is

(*a*) 2 units (*b*) 8 units (*c*) 6 units (*d*) 4 units

9. The distance between the points $(a + b, b + c)$ and $(a - b, c - b)$, is

(*a*) $2\sqrt{3}\,b$ units (*b*) $3\sqrt{2}\,b$ units (*c*) $2\sqrt{2}\,b$ units (*d*) b units

10. The distance between the points ($a \sin 30°$, 0) and (0, $a \sin 60°$) is

(*a*) $a(\sin\theta - \cos\theta)$ units (*b*) $a(\sin\theta + \cos\theta)$ units

(*c*) a^2 units (*d*) a units

11. The points (– 5, 0), (5, 0), (0, 4) are the vertices of

(*a*) an equilateral triangle (*b*) an isosceles triangle

(*c*) a right triangle (*d*) a scalene triangle

12. The perimeter of a triangle with vertices (0, 4), (0, 0) and (3, 0) is

(*a*) 8 units (*b*) 10 units (*c*) 12 units (*d*) 15 units

[CBSE 2012]

13. The area of a triangle whose vertices are (5, 0), (8, 0) and (8, 4) in sq units is

(*a*) 20 (*b*) 12

(*c*) 6 (*d*) 16 **[CBSE SP 2012]**

14. Point A is on the *y*-axis at a distance 4 units from the origin. If the coordinates of B are (– 3, 0), the length of AB is

(*a*) 7 units (*b*) 5 units (*c*) 49 units (*d*) 25 units

[CBSE 2013]

15. If point (0, 3) is equidistant from (5, *a*) and (*a*, *a*) then *a* is equal to

(*a*) 3 or – 3 (*b*) 5 or – 5 (*c*) 4 or – 4 (*d*) 2 or – 2

16. The coordinates of a point on the *x*-axis, which is equidistant from (–2, 5) and (2, – 3) are

(*a*) (– 4, 0) (*b*) (– 5, 0) (*c*) (– 3, 0) (*d*) (– 2, 0)

17. If $\left(\frac{a}{2}, 4\right)$ is the mid-point of the line segment joining the points A(– 6, 5) and B(– 2, 3), then the value of *a* is

(*a*) – 8 (*b*) 3 (*c*) – 4 (*d*) 4 **[CBSE SP 2011]**

18. If the point (*x*, 4) lies on a circle whose centre is O(0, 0) and radius is 5, then *x* is equal to

(*a*) ± 5 (*b*) ± 3 (*c*) 0 (*d*) ± 4

19. The length of a line segment is 10 units. If one end point is the point (2, –3) and the abscissa of the second end point is 10, then its ordinate is

(*a*) 3 or – 9 (*b*) – 3 or 9 (*c*) 6 or 27 (*d*) – 6 or – 27

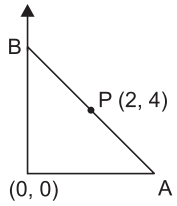
20. If the distance of the point P(*x*, *y*) from the point A(5, 1) and B(–1, 5) are equal then

(*a*) $y = 5x$ (*b*) $5x = y$ (*c*) $2x = 3y$ (*d*) $3x = 2y$

21. If A(1, 1) and B(7, 9) are the end points of the diameter of circle, then the coordinates of the centre of the circle are

(*a*) (4, 5) (*b*) (5, 4) (*c*) (8, 2) (*d*) (2, 8)

22. In the figure given alongside, point P(2, 4) is the mid-point of line segment AB, then the coordinates of A and B respectively are



(*a*) A(0, 4), B(8, 0) (*b*) A(8, 0), B(0, 4)

(*c*) A(4, 0), B(0, 8) (*d*) A(2, 6), B(6, 2)

23. A circle drawn with C(2, – 4) as the centre passes through (5, – 8). The point which does not lie in the interior of the circle is

(*a*) (– 1, – 4) (*b*) (1, –3) (*c*) (2, 0) (*d*) (9, 4)

24. If the vertices of a rhombus taken in order are (3, 4), (–2, 3) and (–3, –2), then the coordinates of the fourth vertex are

(*a*) (–1, –2) (*b*) (–2, –3) (*c*) (2, – 1) (*d*) (1, 2)

25. If A(6, 1), B(8, 2), C(9, 4) and D(x, 3) are the vertices of a parallelogram ABCD, then the value of x is

(*a*) 3 (*b*) 7 (*c*) 6 (*d*) 5

26. If A(5, p), B(1, 5), C(2, 1) and D(6, 2) are the vertices of a square then

(*a*) $p = 7$ (*b*) $p = 3$ (*c*) $p = 6$ (*d*) $p = 8$

27. If two adjacent vertices of a parallelogram are (3, 2) and (–1, 0) and its diagonals intersect at (2, –5), then the coordinates of the remaining vertices are

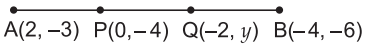
(*a*) (1, –12), (5, –10) (*b*) (12, 1), (10, 5)

(*c*) (–12, –1), (–10, –5) (*d*) (–1, 12), (–5, 10)

28. If the coordinates of the mid-points of the line joining the points (3p, 4) and (–2, 2q) are (5, p), then

(*a*) $p = 5, q = 8$ (*b*) $p = 3, q = 4$ (*c*) $p = 4, q = 2$ (*d*) $p = 2, q = 5$

29. In the given figure, P(0, –4) and Q(–2, y) are the points of trisection of the line joining A(2, –3) and B(–4, –6), then y equals



(*a*) –3 (*b*) 3 (*c*) – 5 (*d*) 5

30. The line segment joining the points (3, – 4) and (1, 2) is trisected at points P(p, –2) and $Q\left(\frac{5}{3}, q\right)$. Find the values of p and q.

(*a*) $p = \frac{8}{3}, q = \frac{2}{3}$ (*b*) $p = \frac{7}{3}, q = 0$

(*c*) $p = \frac{1}{3}, q = 1$ (*d*) $p = \frac{2}{3}, q = \frac{1}{3}$

31. The coordinates of the point P dividing the line segment joining the points A(1, 3) and B(4, 6) in the ratio 2 : 1 are

(*a*) (2, 4) (*b*) (3, 5) (*c*) (4, 2) (*d*) (5, 3)

[CBSE SP 2012]

32. The ratio in which the line segment joining the points (–3, 5) and (4, –9) is divided by (2, –5) is

(*a*) 2 : 3 (*b*) 5 : 2 (*c*) 2 : 5 (*d*) 3 : 2

33. The ratio in which the line segment joining A(–2, –3) and B(3, 7) is divided by the y-axis is

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

34. If the centroid of the triangle formed by (x, 0), (5, –2) and (–8, y) is at (–2, 1) then (x, y) is equal to

(*a*) (–3, 5) (*b*) (3, –5) (*c*) (4, 6) (*d*) (6, 4)

For Standard Level

35. The perpendicular bisector of the line segment joining the points A(2, 3) and B(5, 6) cuts the y-axis at

(a) (8, 0) (b) (0, 8) (c) (0, – 8) (d) (0, 7)

36. The length of median AD of a triangle formed by A(7, –3), B(5, 3) and C(3, –1) is

(a) 3 units (b) 7 units (c) 5 units (d) 10 units

37. The coordinates of a point on x-axis which lies on the perpendicular bisector of line segment joining the points (7, 6) and (–3, 4) are

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

38. If point $P\left(-\frac{1}{3}, 0\right)$ divides the line segment joining A(1, –2) and B(–3, 4) in the ratio 1 : 2, then the coordinates of point Q which divides AB in the ratio 2 : 1 are

(a) $\left(-\frac{5}{3}, 2\right)$ (b) $\left(2, -\frac{5}{3}\right)$ (c) $\left(\frac{5}{3}, 2\right)$ (d) $\left(\frac{5}{3}, -2\right)$

39. The point P which divides the line segment joining the points A(2, – 5) and B(5, 2) in ratio 2 : 3 internally lies in the

(a) I quadrant (b) II quadrant

(c) III quadrant (d) IV quadrant **[CBSE 2011]**

40. If the point $P\left(-3, \frac{2}{3}\right)$ lies on the line segment joining points A(– 5, – 4) and B(–2, 3), then

(a) AP = 3PB (b) AP = 2PB (c) AP = $\frac{1}{2}$ AB (d) AP = $\frac{1}{3}$ AB

41. If two vertices of a triangle are (3, 2) and (–2, 1) and its centroid is at $\left(\frac{5}{3}, -\frac{1}{3}\right)$, then the coordinates of the third vertex are

(a) (–3, 5) (b) (4, –4) (c) (2, –2) (d) (3, 4)

42. If the vertices of a triangle are (3, –5), (–7, 4), (10, –k) and its centroid is (k, –1), then

(a) $k = 3$ (b) $k = 1$ (c) $k = 2$ (d) $k = 4$

43. If origin is the centroid of a triangle whose vertices are A(a, b), B(b, c) and C(c, a), then the value of $a + b + c$ is

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

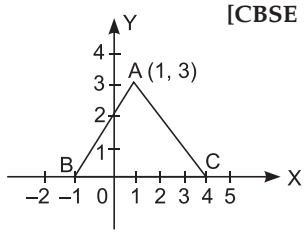
44. If the points (0, 0), (1, 2) and (x, y) are collinear, then

(a) $x = y$ (b) $2x = y$ (c) $x = 2y$ (d) $2x = -4y$ **[CBSE 2012]**

45. In the given figure, the area of triangle ABC (in sq units) is:

(a) 15 (b) 10

(c) 7.5 (d) 2.5 **[CBSE 2013]**



Chapter 8: **Trigonometric Ratios**

MULTIPLE-CHOICE QUESTIONS

For Basic and Standard Levels

Choose the correct answer from the given four options in the following questions:

1. Which of the following is not defined?

(*a*) cos 0° (*b*) tan 45°

(*c*) sec 90° (*d*) sin 90° **[CBSE SP 2011]**

2. The maximum value of $\frac{1}{\text{cosec}\,\theta}$ $(0° \le \theta \le 90°)$ is

(*a*) 1 (*b*) 0 (*c*) $\frac{1}{2}$ (*d*) $\frac{\sqrt{3}}{2}$

3. If $\tan A = \frac{3}{4}$ and A is acute, then the value of cos A is

(*a*) $\frac{5}{4}$ (*b*) $\frac{5}{3}$ (*c*) $\frac{3}{5}$ (*d*) $\frac{4}{5}$

4. In ΔABC, if $\angle B = 90°$, $\sin A = \frac{3}{5}$, then the value of cos C is

(*a*) $\frac{5}{4}$ (*b*) $\frac{4}{5}$ (*c*) $\frac{3}{5}$ (*d*) $\frac{5}{3}$

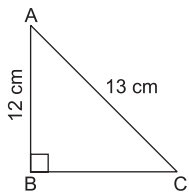
5. In ΔABC, if $\angle A + \angle B = 90°$, $\cot B = \frac{3}{4}$, then the value of tan A is

(*a*) $\frac{4}{5}$ (*b*) $\frac{3}{4}$ (*c*) $\frac{4}{3}$ (*d*) $\frac{3}{5}$

6. If $\sec A = \frac{2}{\sqrt{3}}$ and $\angle A + \angle B = 90°$, then the value of cosec B is

(*a*) $\frac{1}{\sqrt{3}}$ (*b*) $\frac{\sqrt{3}}{2}$ (*c*) $\frac{2}{\sqrt{3}}$ (*d*) $\sqrt{3}$

7. In the given figure, tan A – cot C is equal to

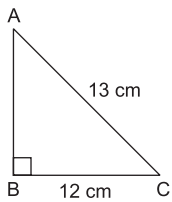


(*a*) $\frac{7}{13}$ (*b*) $\frac{-7}{13}$

(*c*) $\frac{5}{12}$ (*d*) 0

[CBSE SP 2011]

8. In the figure, AC = 13 cm, BC = 12 cm, then sec C is equal to

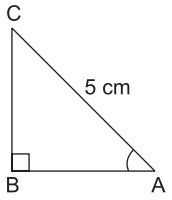


(*a*) $\frac{13}{12}$ (*b*) $\frac{5}{12}$

(*c*) $\frac{12}{13}$ (*d*) $\frac{5}{13}$

[CBSE SP 2011]

9. In the given figure, ΔABC is right-angled at B and $\tan A = \frac{4}{3}$. If AC = 5 cm, the length of BC is

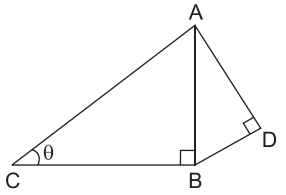


(*a*) 4 cm (*b*) 3 cm

(*c*) 12 cm (*d*) 9 cm

[CBSE SP 2011]

10. In the given figure, AD = 4 cm, BD = 3 cm and CB = 12 cm, the value of cot θ is

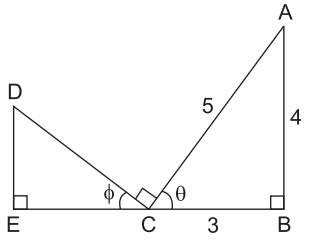


(*a*) $\frac{12}{5}$ (*b*) $\frac{5}{12}$

(*c*) $\frac{13}{12}$ (*d*) $\frac{12}{13}$

[CBSE 2008, CBSE SP 2010, 2011]

11. In the given figure, the value of cos ϕ is

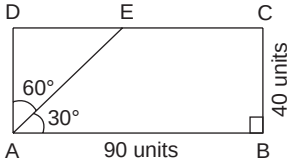


(*a*) $\frac{5}{4}$ (*b*) $\frac{5}{3}$

(*c*) $\frac{3}{5}$ (*d*) $\frac{4}{5}$

[**Hint:** 90° + θ + ϕ = 180° and θ + 90° + ∠A = 180°
⇒ ϕ = ∠A]

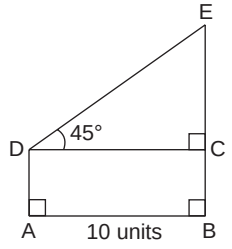
12. If ABCD is a rectangle, then AE is equal to



(*a*) 80 units (*b*) 90 units

(*c*) 85 units (*d*) 70 units

13. In the adjoining figure, the value of CE + DE (using $\sqrt{2}$ = 1.41) is



(*a*) 36.15 units (*b*) 48.2 units

(*c*) 24.1 units (*d*) 12.05 units

14. If A is an acute angle in a right ΔABC, right-angled at B, then the value of sin A + cos A is

(*a*) equal to 1 (*b*) greater than 1

(*c*) less than 1 (*d*) 2 **[CBSE SP 2011]**

15. If $\cos\theta = \frac{1}{2}$, then the value of (cos θ – sec θ) is

(*a*) $\frac{3}{2}$ (*b*) $\frac{-3}{2}$ (*c*) $\frac{\sqrt{3}}{2}$ (*d*) $\frac{-\sqrt{3}}{2}$

[CBSE SP 2011]

16. If cot A = $\frac{12}{5}$, then the value of (sin A + cos A) × cosec A is

(*a*) $\frac{13}{5}$ (*b*) $\frac{17}{5}$ (*c*) $\frac{14}{5}$ (*d*) 1

[CBSE SP 2011]

17. If cosec A = 2, then the value of cot A + $\frac{\sin A}{1+\cos A}$ is

(*a*) $\frac{2}{3}$ (*b*) $\frac{3}{2}$ (*c*) 2 (*d*) $\frac{1}{2}$

[CBSE SP 2011]

18. If sec $\alpha = \frac{5}{4}$, then the value of $\frac{1-\tan\alpha}{1+\tan\alpha}$ is

(*a*) 2 (*b*) 7 (*c*) $\frac{1}{7}$ (*d*) $\frac{2}{7}$

19. If sec $\theta = \frac{3}{2}$, then $\tan^2\theta$ is equal to

(*a*) $\frac{5}{4}$ (*b*) $\frac{9}{4}$ (*c*) $\frac{3}{4}$ (*d*) $\frac{1}{4}$

[CBSE SP 2011]

20. If cot $\theta = \sqrt{5}$, then the value of $\frac{\text{cosec}^2\theta - \sec^2\theta}{\text{cosec}^2\theta + \sec^2\theta}$ is

(*a*) $\frac{2}{3}$ (*b*) $\frac{2}{5}$ (*c*) $\frac{3}{2}$ (*d*) $\frac{5}{2}$

21. The value of $\frac{\tan 45°}{\sin 30° + \cos 60°}$ is

(*a*) $\frac{1}{\sqrt{2}}$ (*b*) 2 (*c*) $\sqrt{2}$ (*d*) 1

22. The value of cosec 30° + cot 45° is

(*a*) – 1 (*b*) 2 (*c*) 3 (*d*) 2

[CBSE SP 2011]

23. The value of $\sin^2 30° - \cos^2 30°$ is

(*a*) $\frac{-1}{2}$ (*b*) $\frac{\sqrt{3}}{2}$ (*c*) $\frac{3}{2}$ (*d*) $\frac{2}{3}$

[CBSE SP 2011]

24. In ΔABC right-angled at B, the value of cos (A + C) is

(*a*) $\frac{1}{\sqrt{2}}$ (*b*) $\frac{1}{2}$ (*c*) 0 (*d*) 1

25. If θ = 30° then the value of $\frac{1-\tan^2\theta}{1+\tan^2\theta}$ is

(*a*) $\frac{3}{2}$ (*b*) $\frac{1}{3}$ (*c*) $\frac{1}{2}$ (*d*) $\frac{2}{3}$

26. If sin A = $\frac{1}{2}$ and cos B = $\frac{1}{2}$ then the value of A + B is equal to

(*a*) 0° (*b*) 60° (*c*) 90° (*d*) 30°

[CBSE SP 2011]

27. If $\sin 2A = 1$, $0° < A < 90°$, then the value of A is

(*a*) 30° (*b*) 45° (*c*) 60° (*d*) 90°

28. If $2 \cos 3A = 1$, then the value of A is

(*a*) 40° (*b*) 60° (*c*) 80° (*d*) 20°

29. If $\tan 3\theta = \sin 30° + \cos 45° \sin 45°$ then the value of θ is

(*a*) 15° (*b*) 30° (*c*) 45° (*d*) 60°

30. If for some angle θ, $\cot 2\theta = \frac{1}{\sqrt{3}}$, then the value of $\sin 3\theta$, where $3\theta \le 90°$ is

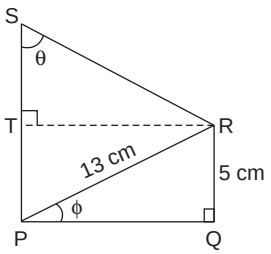
(*a*) $\frac{1}{\sqrt{2}}$ (*b*) 1 (*c*) 0 (*d*) $\frac{\sqrt{3}}{2}$

For Standard Level

31. If $\text{cosec}\ \theta = 2$, $\cot \theta = \sqrt{3}p$, then the value of p is

(*a*) $\sqrt{3}$ (*b*) 2 (*c*) $\frac{2}{\sqrt{3}}$ (*d*) 1

32. In the given figure, PS = 14 cm, the value of $\tan \theta$ is

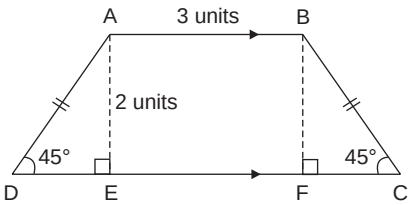


(*a*) $\frac{14}{3}$ (*b*) $\frac{4}{3}$

(*c*) $\frac{5}{3}$ (*d*) $\frac{13}{3}$

[CBSE SP 2011]

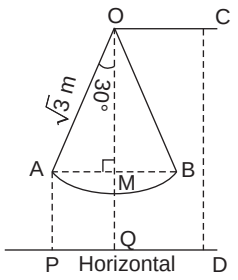
33. In the adjoining figure, if ABCD is an isosceles trapezium, its perimeter (using $\sqrt{2} = 1.41$) is



(*a*) 17.64 units (*b*) 18.64 units

(*c*) 15.64 units (*d*) 16.64 units

34. A pendulum of length $\sqrt{3}$ m is attached to a point 2.3 m from the ground. It swings through an angle of 30° on each side of the vertical. The height above the ground at ends of its path is



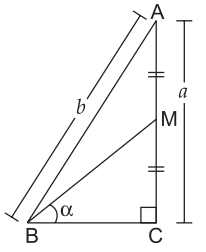
(*a*) 0.9 m (*b*) 0.6 m

(*c*) 0.7 m (*d*) 0.8 m

[**Hint:** $\cos 30° = \frac{OM}{AO} \Rightarrow \frac{\sqrt{3}}{2} = \frac{OM}{\sqrt{3}} \Rightarrow OM = \frac{3}{2} = 1.5$

AP = MQ = CD – OM = (2.3 – 1.5) m = 0.8 m]

35. In the given figure, AM = MC and $\angle C$ is a right angle then $\sin^2 \alpha - \cos^2 \alpha$ is equal to



(*a*) $\frac{4b^2 - 3a^2}{5a^2 - 4b^2}$ (*b*) $\frac{5a^2 - 4b^2}{4b^2 - 3a^2}$

(*c*) $\frac{4a^2 - 5b^2}{3b^2 - 4a^2}$ (*d*) $\frac{3b^2 - 4a^2}{4a^2 - 5b^2}$

36. In ΔABC right-angled at C, if tan A = 1, then the value of 2 sin A cos A is

(*a*) 1 (*b*) $\frac{1}{2}$ (*c*) 2 (*d*) $\frac{\sqrt{3}}{2}$

37. If $\tan\theta = \frac{4}{5}$, then the value of $\frac{5\sin\theta - 2\cos\theta}{5\sin\theta + 2\cos\theta}$ is

(*a*) $\frac{1}{3}$ (*b*) $\frac{2}{5}$ (*c*) $\frac{3}{5}$ (*d*) 6

38. If $\sin\theta = \frac{1}{5}$, then the value of $\frac{1}{5}\cot^2\theta + \frac{1}{5}$ is

(*a*) $\frac{1}{125}$ (*b*) $\frac{1}{5}$ (*c*) 25 (*d*) **5**

[CBSE SP 2011]

39. If $\cos\theta = \frac{2}{3}$, then $2\sec^2\theta + 2\tan^2\theta - 7$ is equal to

(*a*) 1 (*b*) 0 (*c*) 3 (*d*) 4

[CBSE SP 2011]

40. $(\sin 90° - \cos 45° + \cos 60°)(\cos 0° + \sin 45° + \sin 30°)$ is equal to

(*a*) $\frac{5}{8}$ (*b*) $\frac{7}{4}$ (*c*) $\frac{4}{7}$ (*d*) $\frac{3}{5}$

Chapter 9: Trigonometric Identities

MULTIPLE-CHOICE QUESTIONS

For Basic and Standard Levels

Choose the correct answer from the given four options in the following questions:

1. (1 – sin A) (sec A + tan A) is equal to

(*a*) cosec A (*b*) sec A (*c*) cos A (*d*) sin A

2. The value of $5 \tan^2 \theta - 5 \sec^2 \theta$ is

(*a*) 1 (*b*) – 5 (*c*) 0 (*d*) 5

[CBSE SP 2011]

3. The value of the expression $(\sec^2 \theta - 1) \cot^2 \theta$ is

(*a*) 2 (*b*) 0 (*c*) – 1 (*d*) 1

4. $(1 + \tan^2 \theta)(1 - \sin \theta)(1 + \sin \theta)(1 + \cos \theta)(1 - \cos \theta)(1 + \cot^2 \theta)$ is equal to

(*a*) – 2 (*b*) 0 (*c*) 1 (*d*) – 1

5. $\frac{1-\tan^2 \theta}{1+\tan^2 \theta}$ is equal to

(*a*) $\tan^2 \theta - \cot^2 \theta$ (*b*) $\cot^2 \theta - \tan^2 \theta$

(*c*) $\cos^2 \theta - \sin^2 \theta$ (*d*) $\sin^2 \theta - \cos^2 \theta$

6. $\sqrt{\frac{1+\cos \theta}{1-\cos \theta}}$ is equal to

(*a*) $\text{cosec}^2 \theta - \cot^2 \theta$ (*b*) $\text{cosec}^2 \theta + \cot^2 \theta$

(*c*) $\text{cosec}\, \theta + \cot \theta$ (*d*) $\cot \theta - \text{cosec}\, \theta$

7. The expression $\sec^4 \theta - \sec^2 \theta$ is equal to

(*a*) $\tan^2 \theta - \tan^4 \theta$ (*b*) $-\tan^4 \theta - \tan^2 \theta$

(*c*) $\tan^2 \theta + \tan^4 \theta$ (*d*) $\tan^4 \theta - \tan^2 \theta$

8. If $x = m \sin \theta$ and $y = n \cos \theta$, then the value of $n^2x^2 + m^2y^2$ is

(*a*) $m^2 + n^2$ (*b*) $m^2 n^2$ (*c*) mn (*d*) m^3n^3

[CBSE SP 2011]

9. If $\frac{\sin x}{(1+\cos x)} + \frac{\sin x}{(1-\cos x)} = k$, then k is equal to

(*a*) 2 cosec x (*b*) 2 sin x (*c*) 2 cos x (*d*) 2 sec x

10. If $1 + 2 \sin^2 \theta \cos^2 \theta = \sin^2 \theta + \cos^2 \theta + 4k \sin^2 \theta \cos^2 \theta$ then

(*a*) $k = \frac{-1}{2}$ (*b*) $k = -1$ (*c*) $k = \frac{1}{2}$ (*d*) $k = 1$

11. If $2x = \text{cosec}\, \theta$ and $\frac{2}{x} = \cot \theta$, then the value of $4\left(x^2 - \frac{1}{x^2}\right)$ is

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

For Standard Level

12. $\frac{\sin\theta}{1+\cos\theta}$ is equal to

(*a*) $\frac{1+\cos\theta}{\sin\theta}$ (*b*) $\frac{1-\cos\theta}{\sin\theta}$ (*c*) $\frac{1-\cos\theta}{\cos\theta}$ (*d*) $\frac{1-\sin\theta}{\cos\theta}$

13. If $\sin\theta = \frac{p}{q}$, then the value of $\tan\theta + \sec\theta$ is

(*a*) $\sqrt{\frac{q-p}{q+p}}$ (*b*) $\sqrt{\frac{q+p}{q-p}}$ (*c*) $\sqrt{\frac{q^2+p^2}{q^2-p^2}}$ (*d*) $\sqrt{\frac{q^2-p^2}{q^2+p^2}}$

14. If $\sec\theta + \tan\theta = x$, then the value of $\sec\theta - \tan\theta$ in terms of x is

(*a*) x^2 (*b*) $\frac{1}{x}$ (*c*) x^3 (*d*) $\frac{x}{2}$

15. If $x = 3\sec^2\theta - 1$ and $y = 3\tan^2\theta - 2$, then $x - y$ is equal to

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

16. If $a\cot\theta + b\operatorname{cosec}\theta = p$ and $b\cot\theta + a\operatorname{cosec}\theta = q$, then the value of $p^2 - q^2$ is equal to

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

[CBSE SP 2011]

17. If $\sin\theta + \sin^2\theta = 1$, then the value of the expression $(\cos^2\theta + \cos^4\theta)$ is

(*a*) 1 (*b*) 3 (*c*) 2 (*d*) $\frac{1}{3}$

18. If $\cos\theta + \cos^2\theta = 1$, then the value of $\sin^2\theta + \sin^4\theta$ is

(*a*) $\frac{1}{2}$ (*b*) 1 (*c*) 0 (*d*) 2

19. If $\sec\theta + \tan\theta = m$, then $\sec\theta$ is equal to

(*a*) $\frac{m^2-1}{m}$ (*b*) $\frac{m^2-1}{2m}$ (*c*) $\frac{m^2+1}{2m}$ (*d*) $\frac{m^2+1}{m}$

20. If $\sec\theta + \tan\theta = m$, then $\tan\theta$ is equal to

(*a*) $\frac{m^2-1}{2m}$ (*b*) $\frac{m^2+1}{2m}$ (*c*) $\frac{m^2-1}{m}$ (*d*) $\frac{m^2+1}{m}$

Chapter 10: Trigonometric Ratios of Complementary Angles

MULTIPLE-CHOICE QUESTIONS

For Basic and Standard Levels

Choose the correct answer from the given four options in the following questions:

1. sin 75° + sec 75° can be expressed in terms of angles between 0° and 45° as
(*a*) sin 15° + sec 15° (*b*) cos 15° + sec 15°
(*c*) cos 15° + cosec 15° (*d*) sin 15° + cosec 15° **[CBSE SP 2011]**

2. The value of cosec A sec (90° – A) – cot A tan (90° – A) is
(*a*) $\sqrt{2}$ (*b*) 1 (*c*) 0 (*d*) 2

3. cos 36° cos 54° – sin 36° sin 54° is equal to
(*a*) 0 (*b*) 1 (*c*) – 1 (*d*) 2

4. The value of $\frac{\sin 18°}{\cos 72°} + \frac{\tan 26°}{\cot 64°}$ is
(*a*) 1 (*b*) 2 (*c*) $\frac{3}{2}$ (*d*) $\frac{2}{3}$

5. The value of $\frac{\tan 55°}{\cot 35°}$ + cot 1° cot 2° cot 3° … cot 89° is
(*a*) –2 (*b*) 2 (*c*) 1 (*d*) 0

6. sin (60° + θ) – cos (30° – θ) is equal to
(*a*) 2 cos θ (*b*) 2 sin θ (*c*) 0 (*d*) 1
[CBSE SP 2011]

7. cosec (69° + θ) – sec (21° – θ) – cot (35° – θ) + tan (55° + θ) is equal to
(*a*) –1 (*b*) $\frac{3}{2}$ (*c*) 0 (*d*) 1

8. 17 $\sec^2$ 29° – 17 $\cot^2$ 61° is equal to
(*a*) 34 (*b*) 0 (*c*) 17 (*d*) 1

9. If α + β = 90° then $\sqrt{\cos\alpha \operatorname{cosec}\beta - \cos\alpha \sin\beta}$ is equal to
(*a*) cos α (*b*) sin α (*c*) sec α (*d*) cosec α

10. If cos (81° + θ) = sin $\left(\frac{k}{3} - \theta\right)$ then *k* is equal to
(*a*) 43.5° (*b*) 54° (*c*) 27° (*d*) 13.5°

11. If $\frac{\cos 20°}{\sin 70°} + \frac{2\cos\theta}{\sin(90° - \theta)} = \frac{k}{2}$ then *k* is equal to
(*a*) 3 (*b*) 5 (*c*) 6 (*d*) 4

12. If $\sin\theta = \cos\theta$ then the value of θ is

(*a*) 0° (*b*) 45° (*c*) 30° (*d*) 90°

13. If $\tan A = \cot B$, then $A + B$ is equal to

(*a*) 0° (*b*) 90° (*c*) $< 90°$ (*d*) $> 90°$

[CBSE SP 2011]

14. If $\cos 9\theta = \sin\theta$ and $9\theta < 90°$ then the value of $\tan 5\theta$ is

(*a*) $\frac{1}{\sqrt{3}}$ (*b*) $\sqrt{3}$ (*c*) 0 (*d*) 1

[CBSE SP 2011]

15. If $\tan 2\theta = \cot(\theta - 18°)$ where 2θ is an acute angle, then the measure of θ is

(*a*) 36° (*b*) 18° (*c*) 72° (*d*) 54°

16. If $\sec 4\theta = \operatorname{cosec}(\theta - 30°)$ where 4θ is an acute angle, then the measure of θ is

(*a*) 110° (*b*) 55° (*c*) 24° (*d*) 40°

17. If $\sin 3A = \cos(A - 26°)$ where $3A$ is an acute angle, then the measure of A is

(*a*) 29° (*b*) 14.5° (*c*) 58° (*d*) 43.5°

18. If $\cos(40° + A) = \sin 30°$, the value of A is

(*a*) 30° (*b*) 40° (*c*) 60° (*d*) 20°

[CBSE SP 2011]

For Standard Level

19. The value of expression $\frac{\sec^2 54° - \cot^2 36°}{\operatorname{cosec}^2 57° - \tan^2 33°} + 2\sin^2 38°\sec^2 52° - \sin^2 45°$ is

(*a*) $\frac{5}{2}$ (*b*) $\frac{3}{2}$ (*c*) 2 (*d*) $\frac{7}{2}$

20. The value of the expression $\frac{\cos^2(45° - \theta) + \cos^2(45° + \theta)}{\tan^2(30° - \theta)\tan^2(60° + \theta)}$ is equal to

(*a*) $\frac{\sqrt{3}}{2}$ (*b*) $\sqrt{3}$ (*c*) $\frac{1}{\sqrt{3}}$ (*d*) 1

21. If $\frac{\cos^2 20° + \cos^2 70°}{2(\sin^2 59° + \sin^2 31°)} = \frac{2}{k}$ then k is equal to

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

22. If $\sin\theta - \cos\theta = 0$, then the value of the expression $\sin^6\theta + \cos^6\theta$ is

(*a*) $\frac{2}{3}$ (*b*) $\frac{1}{3}$ (*c*) $\frac{3}{4}$ (*d*) $\frac{1}{4}$

23. If $\sin\theta + \cos\theta = \sqrt{2}\cos(90° - \theta)$, then the value of $\cot\theta$ is

(*a*) $\frac{1}{\sqrt{2}+1}$ (*b*) $\sqrt{2}-1$ (*c*) $\sqrt{2}+1$ (*d*) $\frac{1}{\sqrt{2}-1}$

24. In ΔABC, $\sin\frac{B+C}{2}$ in terms of $\angle A$ is

(*a*) $\text{cosec}\,\frac{A}{2}$ (*b*) $\sec\frac{A}{2}$

(*c*) $\sin\frac{A}{2}$ (*d*) $\cos\frac{A}{2}$

25. If $\cos(\alpha + \beta) = 0$, then $\sin(\alpha - \beta)$ can be reduced to

(*a*) $\cos\beta$ (*b*) $\cos 2\beta$ (*c*) $\sin\alpha$ (*d*) $\sin 2\alpha$

[**Hint:** $\cos(\alpha + \beta) = 0 = \cos 90° \Rightarrow \alpha + \beta = 90° \Rightarrow \alpha + \beta - 2\beta = 90° - 2\beta$
$\Rightarrow \sin(\alpha + \beta - 2\beta) = \sin(90° - 2\beta) \Rightarrow \sin(\alpha - \beta) = \cos 2\beta$]

Chapter 11: Some Applications of Trigonometry

MULTIPLE-CHOICE QUESTIONS

For Basic and Standard Levels

Choose the correct answer from the given four options in the following questions:

1. The angle formed by the line of sight with the horizontal when the point being viewed lies above the horizontal level, is called

(*a*) vertical angle (*b*) angle of depression

(*c*) angle of elevation (*d*) obtuse angle **[CBSE SP 2012]**

2. The angle of elevation of the top of a tower from a point on the ground, 20 m away from the foot of the tower is 60°. Then, the height of the tower is

(*a*) 20 m (*b*) $20\sqrt{3}$ m (*c*) $10\sqrt{3}$ m (*d*) $15\sqrt{3}$ m

3. A bridge across a river makes an angle of 30° with the river bank. If the length of the bridge across the river is 98 m, then the width of the river is

(*a*) 49 m (*b*) 98 m (*c*) 24.5 m (*d*) 73.5 m

4. A kite flying at a height of 82.5 m from the level ground, is attached to a string inclined at 30° to the horizontal. Then, the length of the string is

(*a*) 175 m (*b*) 160 m (*c*) 156 m (*d*) 165 m

5. If the length of the shadow of a vertical pole is equal to its height, the angle of elevation of sun's altitude is

(*a*) 45° (*b*) 60° (*c*) 30° (*d*) 75°

6. The measure of angle of elevation of top of the tower $75\sqrt{3}$ m high from a point at a distance of 75 m from foot of the tower in a horizontal plane is

(*a*) 30° (*b*) 60° (*c*) 90° (*d*) 45° **[CBSE SP 2012]**

7. If the Sun's elevation is 30°, the shadow of a tower is 30 m. If the Sun's elevation is 60°, then the length of the shadow is

(*a*) 35 m (*b*) 20 m (*c*) 10 m (*d*) 15 m

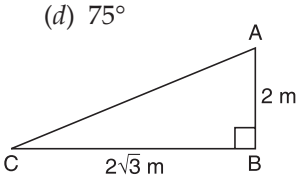
8. An observer 1.4 m tall is 28.6 m away from a tower 30 m high. The angle of elevation of the top of the tower from his eye is

(*a*) 60° (*b*) 45° (*c*) 30° (*d*) 75°

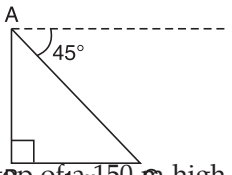
9. The given figure shows the observation of point C from point A. The angle of depression from A is

(*a*) 60° (*b*) 30°

(*c*) 45° (*d*) 75° **[CBSE SP 2012]**



10. The angle of depression of point C when observed from point A is 45°. If BC = 1 m, then AB is equal to



(*a*) 1.5 m (*b*) 0.5 m

(*c*) 1 m (*d*) 2 m

11. The angle of depression of a car parked on the road from top of a 150 m high tower is 30°. The distance of the car from the tower (in metres) is

(*a*) $50\sqrt{3}$

(*b*) $150\sqrt{3}$

(*c*) $150\sqrt{2}$

(*d*) 75 **[CBSE 2014]**

12. A vertical stick 30 m long casts a shadow 15 m long on the ground. At the same time a tower casts a shadow 75 m long on the ground. The height of the tower is

(*a*) 150 m (*b*) 100 m

(*c*) 25 m (*d*) 200 m **[CBSE SP 2012]**

13. The Qutub Minar casts a shadow 150 m long and at the same time another minar casts a shadow 120 m long on the ground. If the height of the second minar is 80 m, then the height of Qutub Minar is

(*a*) 100 m (*b*) 120 m

(*c*) 130 m (*d*) 140 m

For Standard Level

14. A man is climbing a ladder which is inclined to the wall at an angle of 30°. If he ascends at the rate of 2 m/s then he approaches the wall at the rate of

(*a*) 2 m/s (*b*) 2.5 m/s

(*c*) 1 m/s (*d*) 1.5 m/s

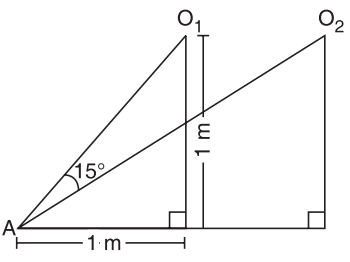
[**Hint:** The ladder is inclined at 60° to the ground and $\cos 60° = \frac{1}{2}$]

15. If a 1.5 m tall girl stands at a distance of 3 m from a lamp post and casts a shadow 4.5 m on the ground, then the height of the lamp post is

(*a*) 1.5 m (*b*) 2.5 m

(*c*) 2 m (*d*) 2.8 m

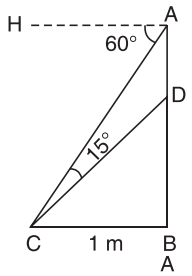
16. The given figure shows the observation of an object at A from point O_1 and point O_2. The angles of depression from O_1 and O_2 are respectively



(*a*) 45°, 30° (*b*) 30°, 60°

(*c*) 60°, 45° (*d*) 75°, 45°

17. In the given figure, if BC = 1 m, then the measure of DB and the angle of depression of point C when observed from point D are respectively



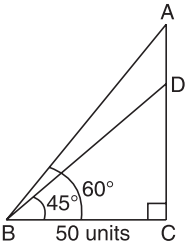
(*a*) 1 m, 45°

(*b*) 1.5 m, 60°

(*c*) 0.5 m, 75°

(*d*) 2 m, 15°

18. In the given figure, find the measure of AD.



(*a*) $50(\sqrt{3}+1)$ units

(*b*) $50(\sqrt{3}-1)$ units

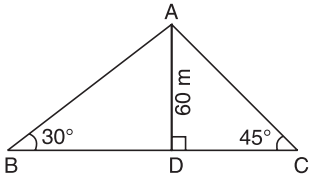
(*c*) $25(\sqrt{3}-1)$ units

(*d*) $25(\sqrt{3}+1)$ units

19. If the angles of elevation of the top of a tower from two points at a distance of 4 m and 16 m from the base of a tower and in the same line are complementary, then the height of the tower is

(*a*) 20 m (*b*) 12 m (*c*) 8 m (*d*) 16 m

20. In the given figure, two men are on the opposite side of a tower. If the height of the tower is 60 m, then the distance between them is



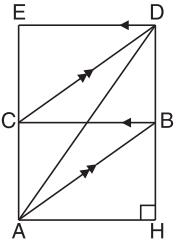
(*a*) $60(\sqrt{3}-1)$ m

(*b*) $30(\sqrt{3}+1)$ m

(*c*) $30(\sqrt{3}-1)$ m

(*d*) $60(\sqrt{3}+1)$ m

21. ABCD represents a flight of stairs. AH is a horizontal through A. If HB = BD = $\frac{3\sqrt{3}}{2}$ m and AH = 3 m, then the angle of depression of point A when observed from point D is



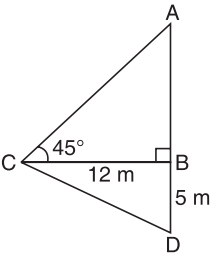
(*a*) 75°

(*b*) 60°

(*c*) 30°

(*d*) 45°

22. In the adjoining figure, the perimeter of ΔACD is



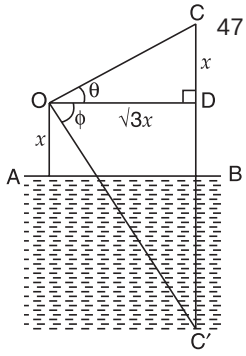
(*a*) $5(6+2\sqrt{2})$ m

(*b*) $6(5+2\sqrt{2})$ m

(*c*) $6(5-2\sqrt{2})$ m

(*d*) $5(6-2\sqrt{2})$ m

23. In the adjoining figure if C′ is the reflection of cloud C in the lake, then the sum of the angle of elevation (θ), of point C and the angle of depression (ϕ) of point C′ from the same point of observation O is



(*a*) 45°

(*b*) 30°

(*c*) 90°

(*d*) 60°

24. If the height of a tower and distance of the point of observation from its foot both are increased by 10%, then the angle of elevation of the top

(*a*) becomes double (*b*) remains unchanged

(*c*) becomes half (*d*) becomes one-third

25. If the angles of elevation of a tower from two points at a distance of *a* and *b* from its foot and in the same straight line with it are complementary, then the height of the tower is

(*a*) $\frac{a}{b}$ (*b*) ab (*c*) $\sqrt{ab}$ (*d*) $\sqrt{\frac{a}{b}}$

26. A man on the top of a cliff '*x*' metres high observes that the angle of elevation of a tower is equal to the angle of depression of the foot of the tower. The height of the tower in metres is

(*a*) $2\sqrt{2}x$ (*b*) $2x$ (*c*) $\sqrt{2}\,x$ (*d*) $\frac{x}{2}$

27. An aeroplane when '*x*' metres high passes vertically above another aeroplane at an instant when the angles of elevation of the two aeroplanes from the same point on the ground are 60° and 45° respectively. Then, the vertical distance between the two aeroplanes (in metres) is

(*a*) $(3\sqrt{2}-1)x$ (*b*) $\frac{(\sqrt{3}-1)}{\sqrt{3}}x$ (*c*) $\frac{(\sqrt{3}+1)}{\sqrt{3}}x$ (*d*) $(3\sqrt{2}+1)\,x$

28. The angle of elevation of the top of a hill at the foot of a tower is 60° and the angle of elevation of the top of the tower from the foot of the hill is 30°. If the tower is '*x*' metres high, then the height of the hill (in metres) is

(*a*) $2x$ (*b*) $3x$ (*c*) $\sqrt{3}\,x$ (*d*) $(\sqrt{3}+1)x$

29. There is a small island in the middle of a '*x*' metre wide river and a tall tree stands on the island. P and Q are points directly opposite to each other on the two banks, and in line with the tree. If the angles of elevation of the top of the tree from P and Q are 30° and 45°, then the height of the tree in metres is

(*a*) $(2-\sqrt{3})x$ (*b*) $(2+\sqrt{3})x$ (*c*) $\frac{(\sqrt{3}-1)x}{2}$ (*d*) $\frac{(\sqrt{3}+1)x}{2}$

30. If the height of a flagstaff is twice the height of the tower on which it is fixed and the angle of elevation of the top of the tower as seen from a point on the ground is 30°, then the angle of the top of the flagstaff as seen from the same point is

(*a*) 45° (*b*) 30° (*c*) 60° (*d*) 90°

Chapter 12: **Circles**

MULTIPLE-CHOICE QUESTIONS

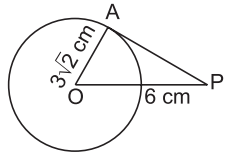
For Basic And Standard Levels

Choose the correct answer from the given four options in the following questions:

1. The length of a tangent PQ, from an external point P is 24 cm. If the distance of the point P from the centre is 25 cm, then the diameter of the circle is

(*a*) 15 cm (*b*) 14 cm (*c*) 7 cm (*d*) 12 cm

2. A tangent PA is drawn from an external point P to a circle of radius $3\sqrt{2}$ cm such that the distance of the point P from O is 6 cm as shown in the figure. The value of ∠APO is



(*a*) 30° (*b*) 45°

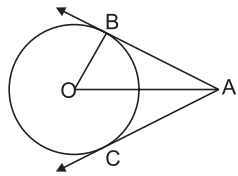
(*c*) 60° (*d*) 70° **[CBSE SP 2012]**

3. How many parallel tangents can a circle have?

(*a*) 1 (*b*) 2

(*c*) infinite (*d*) none of these **[CBSE SP 2012]**

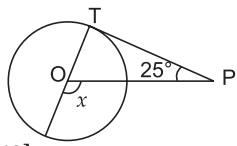
4. In the adjoining figure, AB and AC are tangents to a circle with centre O and radius 8 cm. If OA = 17 cm, then the length of AC (in cm) is **[CBSE 2012]**



(*a*) $\sqrt{353}$ cm (*b*) 15 cm

(*c*) 9 cm (*d*) 25 cm

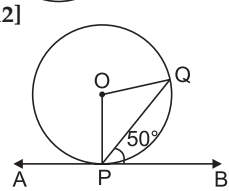
5. If PT is a tangent of the circle with centre O and ∠TPO = 25°, then the measure of *x* is



(*a*) 120° (*b*) 125°

(*c*) 110° (*d*) 115° **[CBSE SP 2012]**

6. APB is a tangent to a circle with centre O, at point P. If ∠QPB = 50°, then the measure of ∠POQ is



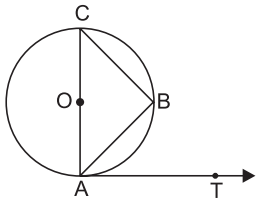
(*a*) 120° (*b*) 100°

(*c*) 140° (*d*) 150°

7. If the angle between the radii of a circle is 100°, then the angle between the tangents at the end of those two radii is

(*a*) 50° (*b*) 60° (*c*) 80° (*d*) 90° **[CBSE 2012]**

8. AB is a chord of a circle and AOC is its diameter such that ∠ACB = 40°. If AT is the tangent to the circle at the point A, then ∠BAT is equal to



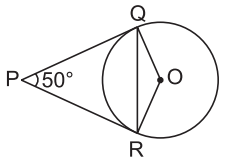
(*a*) 45° (*b*) 60°

(*c*) 40° (*d*) 50°

9. PQ is a tangent drawn from a point P to a circle with centre O and QOR is a diameter of the circle such ∠POR = 120°, then ∠OPQ is

(*a*) 30° (*b*) 60° (*c*) 45° (*d*) 35°

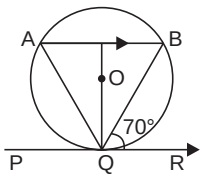
10. If PQ and PR are tangents to the circle with centre O such that ∠QPR = 50°, then ∠OQR is equal to



(*a*) 25° (*b*) 30°

(*c*) 40° (*d*) 50° **[CBSE SP 2012]**

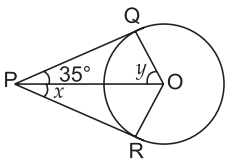
11. If PQR is a tangent to a circle at Q whose centre is O, AB is a chord parallel to PR and ∠BQR = 70°, then ∠AQB is equal to



(*a*) 20° (*b*) 40°

(*c*) 35° (*d*) 45° **[CBSE SP 2012]**

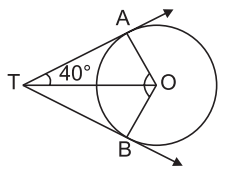
12. PQ and PR are tangents from an external point P, to a circle with centre O. If ∠QPO = 35°, then measures of x and y are



(*a*) $x = 30°$, $y = 60°$ (*b*) $x = 35°$, $y = 55°$

(*c*) $x = 40°$, $y = 50°$ (*d*) $x = 45°$, $y = 45°$

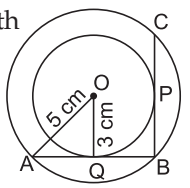
13. In the given figure, if ∠ATO = 40°, then the measure of ∠AOB is



(*a*) 80° (*b*) 100°

(*c*) 90° (*d*) 120° **[CBSE 2008]**

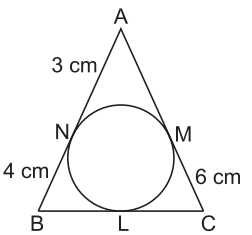
14. Two concentric circles of radii 3 cm and 5 cm are given. The length of chord BC which touches the inner circle at P is equal to



(*a*) 6 cm (*b*) 4 cm

(*c*) 10 cm (*d*) 8 cm

15. In the given figure ΔABC is circumscribing a circle. Then the length of BC is



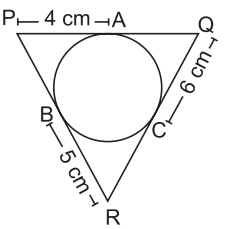
(*a*) 7 cm

(*b*) 8 cm

(*c*) 9 cm

(*d*) 10 cm **[CBSE SP 2012]**

16. The perimeter of ΔPQR in the given figure is



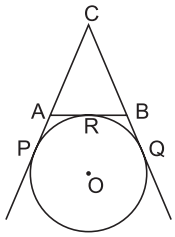
(*a*) 30 cm

(*b*) 15 cm

(*c*) 45 cm

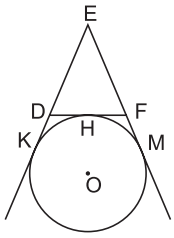
(*d*) 60 cm

17. In the given figure, CP and CQ are tangents to a circle with centre O. ARB is another tangent touching the circle at R. If CP = 11 cm, BC = 7 cm, length of BR is



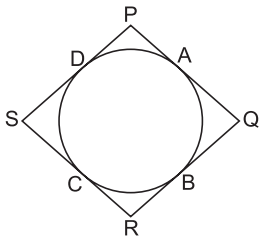
(*a*) 1 cm
(*b*) 2 cm
(*c*) 4 cm
(*d*) 3 cm

18. In the figure, a circle touches the side DF of ΔEDF at H and touches ED and EF produced at K and M respectively. If EK = 9 cm, then perimeter of ΔEDF (in cm) is



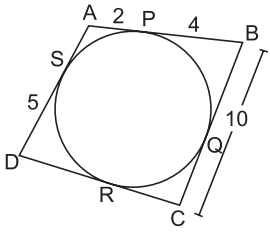
(*a*) 18
(*b*) 13.5
(*c*) 12
(*d*) 9 **[CBSE SP 2012]**

19. Quadrilateral PQRS circumscribes a circle as shown in the figure. The side of the quadrilateral which is equal to PD + QB is



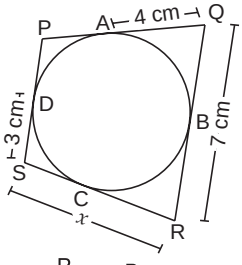
(*a*) PS
(*b*) PR
(*c*) PQ
(*d*) QR

20. In the given figure, perimeter of quadrilateral ABCD is



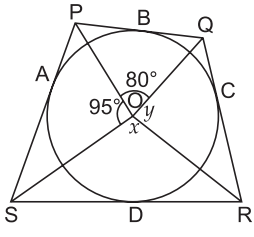
(*a*) 36 units
(*b*) 48 units
(*c*) 28 units
(*d*) 34 units

21. In the given figure, if AQ = 4 cm, QR = 7 cm, DS = 3 cm, then x is equal to



(*a*) 6 cm
(*b*) 8 cm
(*c*) 11 cm
(*d*) 10 cm

22. In the given figure, if quadrilateral PQRS circumscribes a circle, then



(*a*) $x = 95°$, $y = 95°$
(*b*) $x = 100°$, $y = 85°$
(*c*) $x = 110°$, $y = 90°$
(*d*) $x = 85°$, $y = 90°$

23. From a point A which is at a distance of 13 cm from the centre O of a circle of radius 5 cm, the pair of tangents AB and AC to the circle are drawn. Then the area of quadrilateral ABOC is

(*a*) 120 cm^2 (*b*) 50 cm^2 (*c*) 60 cm^2 (*d*) 80 cm^2

24. The maximum number of common tangents that can be drawn to two circles intersecting at two distinct points is

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

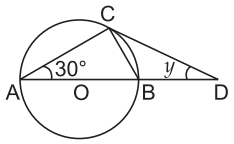
For Standard Level

25. If two tangents inclined at 60° are drawn to a circle of radius 3 cm, then length of each tangent is equal to

(*a*) $3\sqrt{3}$ cm (*b*) 3 cm (*c*) $3\sqrt{2}$ cm (*d*) $2\sqrt{3}$ cm

[CBSE SP 2012]

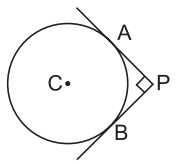
26. In the figure, AB is a diameter and AC is chord of a circle such that $\angle BAC = 30°$. If DC is a tangent, then ΔBCD is



(*a*) isosceles (*b*) equilateral

(*c*) right-angled (*d*) acute angled **[CBSE SP 2012]**

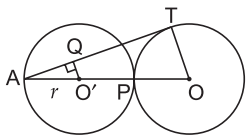
27. In the given figure, PA and PB are two tangents drawn from an external point to a circle with centre C, and radius 4 cm. If PA ⊥ PB, then the length of each tangent is



(*a*) 3 cm (*b*) 4 cm

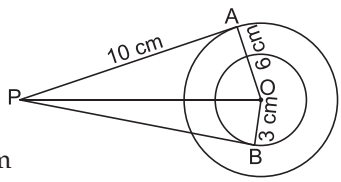
(*c*) 5 cm (*d*) 6 cm **[CBSE 2013]**

28. Equal circles with centre O and O′ touch each other at P. OO′ is produced to meet circle (O′, *r*) at A. AT is a tangent to the circle (O, *r*). O′Q is perpendicular to AT. Then the value of $\frac{AQ}{AT}$ is



(*a*) $\frac{2}{3}$ (*b*) $\frac{1}{2}$ (*c*) $\frac{1}{3}$ (*d*) $\frac{1}{4}$

29. Two concentric circles with centre O are of radii 6 cm and 3 cm. From an external point P, tangents PA and PB are drawn to these circles as shown in the figure. If AP = 10 cm, then BP is equal to



(*a*) $\sqrt{91}$ cm (*b*) $\sqrt{127}$ cm

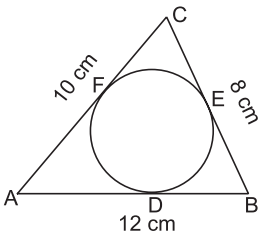
(*c*) $\sqrt{119}$ cm (*d*) $\sqrt{109}$ cm

30. At one end of a diameter PQ of a circle of radius 5 cm, tangent XPY is drawn to the circle. The length of chord AB parallel to XY and at a distance of 8 cm from P is

(*a*) 8 cm (*b*) 6 cm

(*c*) 5 cm (*d*) 7 cm

31. A circle is inscribed in ΔABC having sides 8 cm, 10 cm and 12 cm as shown in the figure. Then,



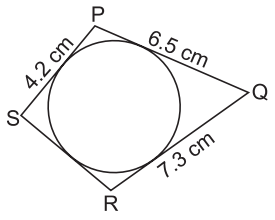
(*a*) AD = 8 cm, BE = 6 cm

(*b*) AD = 6 cm, BE = 4 cm

(*c*) AD = 5 cm, BE = 7 cm

(*d*) AD = 7 cm, BE = 5 cm

32. In the given figure, a circle touches all four sides of a quadrilateral PQRS, whose sides are PQ = 6.5 cm, QR = 7.3 cm, and PS = 4.2 cm, then RS is equal to



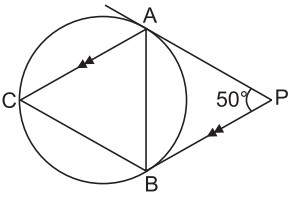
(*a*) 4.7 cm

(*b*) 5.3 cm

(*c*) 7.3 cm

(*d*) 5 cm

33. In the given figure, PA and PB are tangents to a circle from an external point P. If $\angle APB = 50°$ and AC || PB, then the measures of angles of triangle ABC are



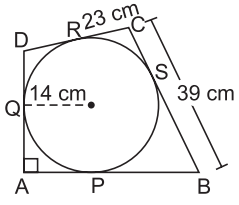
(*a*) 50°, 50°, 80°

(*b*) 50°, 55°, 75°

(*c*) 80°, 60°, 40°

(*d*) 65°, 50°, 65°

34. In the given figure, quadrilateral ABCD is circumscribed, touching the circle at P, Q, R and S such that $\angle DAB = 90°$. If CR = 23 cm and CB = 39 cm and the radius of the circle is 14 cm, then the measure of AB is



(*a*) 16 cm

(*b*) 39 cm

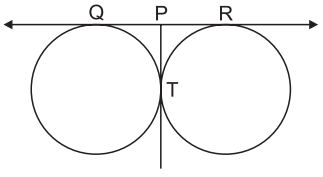
(*c*) 30 cm

(*d*) 37 cm

35. Two circles touch each other externally at P. AB is common tangent to the circles touching them at A and B. The value of $\angle APB$ is

(*a*) 30° (*b*) 45° (*c*) 60° (*d*) 90° **[CBSE 2014]**

36. In the given figure, if QP = 4.5 cm, then the measure of QR is equal to



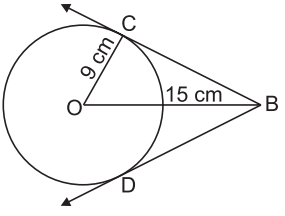
(*a*) 9 cm

(*b*) 13.5 cm

(*c*) 15 cm

(*d*) 18 cm

37. In the given figure, if OC = 9 cm and OB = 15 cm, then BC + BD is equal to



(*a*) 18 cm

(*b*) 12 cm

(*c*) 24 cm

(*d*) 36 cm

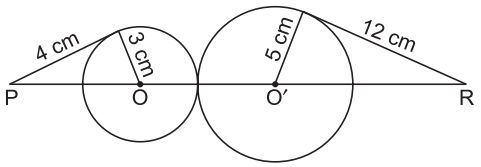
38. In the given figure, the length of PR is

(*a*) 20 cm

(*b*) 26 cm

(*c*) 24 cm

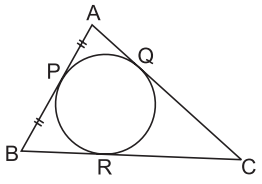
(*d*) 28 cm



39. In the given figure, if AP = PB, then

(*a*) AC = AB (*b*) AC = BC

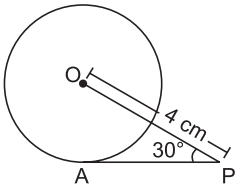
(*c*) AQ = QC (*d*) AB = BC



40. AP is a tangent to the circle with centre O such that OP = 4 cm and $\angle OPA = 30°$. Then, AP is equal to

(*a*) $2\sqrt{2}$ cm (*b*) 2 cm

(*c*) $2\sqrt{3}$ cm (*d*) $3\sqrt{2}$ cm



Chapter 13: **Constructions**

MULTIPLE-CHOICE QUESTIONS

For Basic and Standard Levels

Choose the correct answer from the given four options in the following questions:

1. To divide a line segment AB internally in the ratio 5 : 2, first a ray AX is drawn so that ∠BAX is an acute angle and then points A_1, A_2, A_3, . . . are located at equal distances on ray AX and point B is joined to

(*a*) A_6 (*b*) A_7

(*c*) A_3 (*d*) A_2

2. To divide a line segment AB internally in the ratio 4 : 7 first a ray AX is drawn so that ∠BAX is an acute angle and then at equal distances points are marked on ray AX such that the minimum number of these points is

(*a*) 9 (*b*) 10

(*c*) 11 (*d*) 12

3. To divide a line segment AB in the ratio 3 : 2, draw a ray AX such that ∠BAX is an acute angle, then draw ray BY parallel to AX and then locate points A_1, A_2, A_3 . . . and B_1, B_2, B_3 . . . at equal distances on ray AX and BY respectively. Then the points to be joined are

(*a*) A_3 and B_2 (*b*) A_1 and B_3

(*c*) A_2 and B_3 (*d*) A_3 and B_1

4. To construct a triangle similar to a given triangle ABC with its sides $\frac{2}{3}$ of the corresponding sides of ΔABC, draw a ray BX such that ∠CBX is an acute angle and X lies on the opposite side of A with respect to BC. Then locate points X_1, X_2, X_3 . . . at equal distance on BX. The points to be joined in the next step are

(*a*) X_4 and C (*b*) X_1 and C

(*c*) X_2 and C (*d*) X_3 and C

5. To construct a triangle similar to a given ΔABC with its sides $\frac{7}{5}$ of the corresponding sides of ΔABC, draw a ray BX such that ∠CBX is an acute angle and X is on the opposite side of A with respect to BC. Then, locate points X_1, X_2, X_3 . . . at equal distances on BX. The points to be joined in the next step are

(*a*) X_7 and C (*b*) X_5 and C

(*c*) X_2 and C (*d*) X_{12} and C

6. If two tangents are drawn at the end points of two radii of a circle which are inclined at 120° to each other, then the pair of tangents will be inclined to each other at an angle of

(*a*) 100° (*b*) 60° (*c*) 90° (*d*) 120°

7. To construct a cyclic quadrilateral ABCD in which $\angle B = 90°$, if a circle on which points A, B, C and D lie, has to be drawn, then the centre of this circle is

(*a*) the mid-point of diagonal AC.

(*b*) the mid-point of diagonal BD.

(*c*) the point of intersection of diagonals AC and BD.

(*d*) a point which lies neither on AC nor on BD.

8. To draw a pair of tangents to a circle which are at right angles to each other, it is required to draw tangents at end points of the two radii of the circle, which are inclined at an angle of

(*a*) 45° (*b*) 120°

(*c*) 60° (*d*) 90°

9. To draw a pair of tangents to a circle which are inclined to each other at an angle of 60°, it is required to draw tangents at the end points of the two radii of the circle, which are inclined at an angle of

(*a*) 135° (*b*) 120°

(*c*) 60° (*d*) 90° **[CBSE SP 2012]**

For Standard Level

10. To draw a pair of tangents to a circle which are inclined to each other at angle $x°$, it is required to draw tangents at the end points of those two radii of the circle, the angle between which is

(*a*) $90° - x°$ (*b*) $90° + x°$

(*c*) $180° - x°$ (*d*) $180° + x°$

11. To divide line segment AB in the ratio $m : n$ (m, n are positive integers), draw a ray AX so that $\angle BAX$ is an acute angle and then mark points on ray AX at equal distances such that the minimum number of these points is

(*a*) greater of m and n (*b*) $m + n$

(*c*) $m + n - 1$ (*d*) mn

12. If you draw a pair of tangents to a circle C(O, r) from point P such that $OP = 2r$, then the angle between the two tangents is

(*a*) 90° (*b*) 30°

(*c*) 60° (*d*) 45°

13. To draw tangents to each of the circle with radii 3 cm and 2 cm from the centre of the other circle, such that the distance between their centres A and B is 6 cm, a perpendicular bisector of AB is drawn intersecting AB at M. The next step is to draw

(*a*) a circle with AB as diameter

(*b*) a circle with AM as diameter

(*c*) a circle with MB as diameter

(*d*) extend AB to P such that BP = MB and draw a circle with MP as diameter

14. To draw tangents to a circle of radius 'p' from a point on the concentric circle of radius 'q', the first step is to find

(a) mid-point of q

(b) mid-point of p

(c) mid-point of $q - r$

(d) mid-point of $p + q$

15. To draw a tangent at point B to the circumcircle of an isosceles right ΔABC right angled at B, we need to draw through B

(a) a line parallel to AC

(b) a line perpendicular to AB

(c) a line perpendicular to BC

(d) a line inclined at 60° to AB

Chapter 14: Areas Related to Circles

MULTIPLE-CHOICE QUESTIONS

For Basic and Standard Levels

Choose the correct answer from the given four options in the following questions:

1. If the perimeter of a semi-circular protractor is 36 cm, then its diameter is
(*a*) 10 cm (*b*) 12 cm (*c*) 14 cm (*d*) 16 cm
[CBSE SP 2012]

2. If the circumference of a circle exceeds its diameter by 16.8 cm, then the radius of the circle is
(*a*) 3.92 cm (*b*) 3 cm (*c*) 3.5 cm (*d*) 3.82 cm

3. The diameters of two circles are 38 cm and 18 cm. Then, the diameter of the circle having circumference equal to the sum of circumferences of the two circles is
(*a*) 56 cm (*b*) 52 cm (*c*) 48 cm (*d*) 50 cm

4. The circumference of a circle is 44 cm. By how much should the radius be increased to make the circumference 22 cm longer?
(*a*) 3 cm (*b*) 3.5 cm (*c*) 4 cm (*d*) 7 cm

5. If the radius of a circle is 3.5 cm, then the perimeter of the semicircle is
(*a*) 16 cm (*b*) 21 cm (*c*) 18 cm (*d*) 20 cm

6. The perimeter of a quadrant of a circle of radius $\frac{7}{2}$ cm is
(*a*) 7.5 cm (*b*) 12.5 cm (*c*) 7.5 cm (*d*) 3.5 cm
[CBSE SP 2012]

7. The perimeter (in cm) of a square circumscribing a circle of radius a cm is
(*a*) $8a$ (*b*) $4a$ (*c*) $2a$ (*d*) $16a$ **[CBSE 2011]**

8. If the difference between the circumference and radius of a circle is 37 cm, then using $\pi = \frac{22}{7}$ the circumference (in cm) of the circle is
(*a*) 154 (*b*) 44 (*c*) 14 (*d*) 7 **[CBSE 2013]**

9. If the area of a circle is 154 cm^2, then its perimeter is
(*a*) 33 cm (*b*) 21 cm
(*c*) 42 cm (*d*) 44 cm

10. If π is taken as $\frac{22}{7}$, the distance (in metres) covered by a wheel of diameter 35 cm, in one revolution is
(*a*) 2.2 (*b*) 1.1 (*c*) 9.625 (*d*) 96.25 **[CBSE 2013]**

11. The circumference of a circle is 44 cm. Then, the area of the circle is

(*a*) 276 cm^2 (*b*) 44 cm^2

(*c*) 176 cm^2 (*d*) 154 cm^2 **[CBSE SP 2012]**

12. If the circumference of a circle increases from 2π to 4π then its area is

(*a*) halved (*b*) doubled (*c*) tripled (*d*) four times

[CBSE SP 2012]

13. The area of a square that can be inscribed in a circle of radius 10 cm is

(*a*) $200\sqrt{2}$ cm^2 (*b*) 200 cm^2 (*c*) 256 cm^2 (*d*) $100\sqrt{2}$ cm^2

14. If the areas of two circles are in the ratio 9 : 16, then the ratio of the perimeters of their semicircles is

(*a*) 3 : 4 (*b*) 4 : 3 (*c*) 3 : 2 (*d*) 2 : 3

15. If the circumference of a circle is equal to the perimeter of a square, then the ratio of their areas is

(*a*) 22 : 7 (*b*) 14 : 11 (*c*) 7 : 22 (*d*) 7 : 11

[CBSE SP 2012]

16. If the area of a circle is equal to the sum of areas of circles of diameters 10 cm and 24 cm, then the diameter of the larger circle (in cm) is

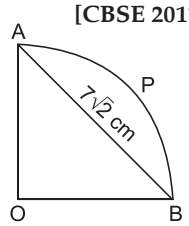
(*a*) 34 (*b*) 26 (*c*) 17 (*d*) 14 **[CBSE SP 2012]**

17. If the area of a circle is numerically equal to twice its circumference then the diameter of the circle is

(*a*) 4 units (*b*) π units

(*c*) 8 units (*d*) 2 units **[CBSE 2011]**

18. In the given figure if the length of chord AB is $7\sqrt{2}$ cm, then the perimeter of the quadrant BPAO is



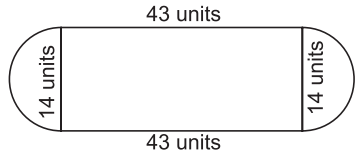
(*a*) 25 cm

(*b*) 50 cm

(*c*) 75 cm

(*d*) 28 cm

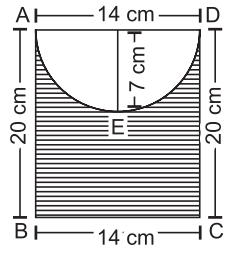
19. The perimeter of the given plot as shown in the figure is



(*a*) 260 units (*b*) 240 units

(*c*) 130 units (*d*) 180 units

20. The perimeter of the shaded region, where AED is a semicircle and ABCD is a rectangle is



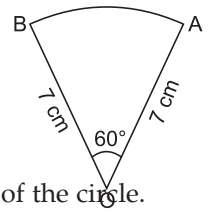
(*a*) 98 cm

(*b*) 84 cm

(*c*) 49 cm

(*d*) 76 cm **[CBSE 2008]**

21. The perimeter of the sector OAB is



(*a*) $\frac{64}{3}$ cm (*b*) 26 cm

(*c*) $\frac{64}{5}$ cm (*d*) 19 cm

22. An arc of length 15.7 cm subtends a right angle at the centre of the circle. Then, the radius of the circle is [Use $\pi = 3.14$]

(*a*) 20 cm (*b*) 10 cm (*c*) 15 cm (*d*) 12 cm

23. If an arc forms 90° at the centre O of the circle, then the ratio of its length to the circumference of the circle is

(*a*) 3 : 4 (*b*) 1 : 3 (*c*) 1 : 4 (*d*) 2 : 3

24. A pendulum swings through an angle of 36° and describes an arc 13.2 cm in length. Then, the length of the pendulum is

(*a*) 21 cm (*b*) 22 cm (*c*) 25 cm (*d*) 24 cm

25. The minute hand of a clock is $\sqrt{21}$ cm long. Then, the area described by the minute hand on the face of the clock between 7 am and 7:05 am is

(*a*) 7.5 cm^2 (*b*) 10.5 cm^2 (*c*) 5.5 cm^2 (*d*) 2.5 cm^2

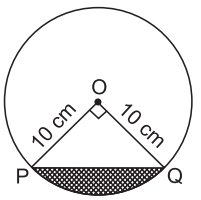
26. In a circle of radius 21 cm, if the angle subtended by the arc at the centre is 60°, then the area of the sector is

(*a*) 250 cm^2 (*b*) 231 cm^2 (*c*) 230 cm^2 (*d*) 131 cm^2

27. If the perimeter of a sector of a circle of radius 6.5 cm is 29 cm, then the area of the sector is

(*a*) 58 cm^2 (*b*) 52 cm^2 (*c*) 25 cm^2 (*d*) 56 cm^2

28. If chord PQ of a circle of radius 10 cm makes a right angle at the centre of the circle, then the area of the minor segment is [Take $\pi = 3.14$]



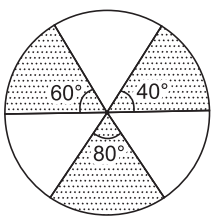
(*a*) 29.5 cm^2 (*b*) 30.5 cm^2

(*c*) 32.5 cm^2 (*d*) 28.5 cm^2

29. If an arc forms 90° at the centre O of the circle, then the ratio of its length to the circumference of the circle is

(*a*) 3 : 4 (*b*) 1 : 3 (*c*) 1 : 4 (*d*) 2 : 3

30. In the given figure, three sectors of a circle of radius 7 cm, making angles of 60°, 80°, 40° at the centre are shaded. The area of the shaded region (in cm^2) is [Using $\pi = \frac{22}{7}$]



(*a*) 77 (*b*) 154

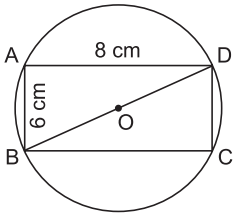
(*c*) 44 (*d*) 22 **[CBSE 2012]**

31. The area of the largest triangle that can be inscribed in a semicircle of radius *r* is

(*a*) $2r$ cm^2 (*b*) r^2 cm^2

(*c*) r cm^2 (*d*) $\sqrt{r}$ cm^2 **[NCERT EXEMPLAR]**

32. In the given figure, a circle circumscribes a rectangle. Then the ratio of the area of the circle to the area of the rectangle is



(*a*) $20\pi : 13$ (*b*) $48\pi : 25$

(*c*) $25\pi : 48$ (*d*) $13\pi : 25$

33. If the areas of two circles are in the ratio 4 : 9, then the ratio of the perimeter of their semicircles is

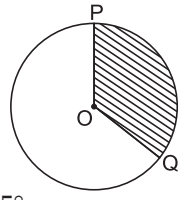
(*a*) 2 : 3 (*b*) 3 : 2 (*c*) 1 : 2 (*d*) 1 : 3

34. The area of a ring shaped region enclosed between two concentric circles of radii 20 cm and 15 cm is

(*a*) 750 cm^2 (*b*) 250 cm^2

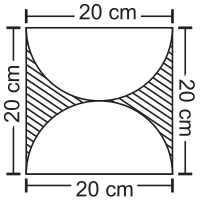
(*c*) 500 cm^2 (*d*) 550 cm^2

35. In the given figure if the area of the shaded sector POQ is $\frac{7}{20}$ of the area of the whole circle, then the measure of $\angle POQ$ is



(*a*) 100° (*b*) 120° (*c*) 126° (*d*) 125°

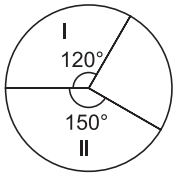
36. The area of the shaded region in the adjoining figure is



(*a*) $\frac{700}{6}$ cm^2 (*b*) $\frac{600}{7}$ cm^2

(*c*) $\frac{1300}{6}$ cm^2 (*d*) $\frac{1300}{7}$ cm^2

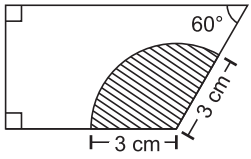
37. The ratio of the areas of sector I and sector II is



(*a*) 5 : 2 (*b*) 3 : 5

(*c*) 5 : 3 (*d*) 4 : 5

38. In the given figure, the area of the shaded sector in terms of π is



(*a*) 3π cm^2 (*b*) 9π cm^2

(*c*) 7π cm^2 (*d*) 6π cm^2

For Standard Level

39. If the area of a square is same as the area of a circle, then the ratio of their perimeters (in terms of π) is

(*a*) $\pi : \sqrt{3}$ (*b*) $2 : \sqrt{\pi}$ (*c*) $3 : \pi$ (*d*) $\pi : \sqrt{2}$

40. If the diameters of two circles are 12 cm and 16 cm, then the diameter of the circle having area equal to the sum of areas of the two circles is

(*a*) 24 cm (*b*) 18 cm (*c*) 20 cm (*d*) 15 cm

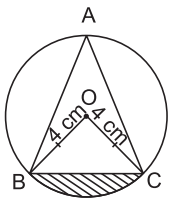
41. The ratio of the areas of a circle and an equilateral triangle whose diameter and a side are respectively equal is

(*a*) $\pi : \sqrt{2}$ (*b*) $\pi : \sqrt{3}$ (*c*) $\sqrt{3} : \pi$ (*d*) $\sqrt{2} : \pi$

42. If the sum of areas of two circles with radii r_1 and r_2 is equal to the area of a circle of radius r, then

(*a*) $r_1^2 + r_2^2 > r$ (*b*) $r_1^2 + r_2^2 = r^2$ (*c*) $r_1^2 + r_2^2 < r_2^2$ (*d*) $r_1^2 - r_2^2 > r^2$

43. In the given figure, ΔABC is an equilateral triangle inscribed in a circle of radius 4 cm and centre O. Then, the area of the shaded region is



(*a*) $\frac{4}{3}\left(4\pi - 3\sqrt{3}\right)\text{cm}^2$ (*b*) $4\left(4\pi - \sqrt{3}\right)\text{cm}^2$

(*c*) $\frac{3}{4}\left(4\pi - 3\sqrt{3}\right)\text{cm}^2$ (*d*) $\frac{1}{4}\left(4\pi - \sqrt{3}\right)\text{cm}^2$

44. If the perimeter of a square and the circumference of a circle are equal, then

(*a*) area of the square > area of the circle

(*b*) area of the square = area of the circle

(*c*) area of the square < area of the circle

(*d*) no definite relationship exists between the areas of the square and the circle.

[NCERT EXEMPLAR]

45. If the perimeter of a square is equal to the perimeter of a circle, then the ratio of their areas is

(*a*) 13 : 22 (*b*) 14 : 11 (*c*) 22 : 13 (*d*) 11 : 14

[NCERT EXEMPLAR]

46. The area of a circle is 64 π cm^2. Its circumference is

(*a*) 7π cm (*b*) 16π cm (*c*) 14π cm (*d*) 21π cm

47. It is proposed to build a single circular park equal in area to the sum of areas to two circular parks of diameters 16 m and 12 m in a locality. The radius of the new park would be

(*a*) 10 m (*b*) 15 m (*c*) 20 m (*d*) 24 m

[NCERT EXEMPLAR]

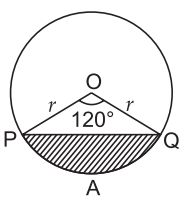
48. The area of a square that can be inscribed in a circle of radius 10 cm is

(*a*) $200\sqrt{2}$ cm^2 (*b*) 200 cm^2 (*c*) 256 cm^2 (*d*) $100\sqrt{2}$ cm^2

49. The area of the circle that can be inscribed in a square of side 10 cm is

(*a*) 40π cm^2 (*b*) 30π cm^2 (*c*) 100π cm^2 (*d*) 25π cm^2

50. In the given figure, area of segment PAQ is



(*a*) $\left(\frac{\pi}{3} - \frac{\sqrt{3}}{2}\right)r^2$ (*b*) $\left(\frac{\pi}{3} - \frac{\sqrt{3}}{4}\right)r^2$

(*c*) $\left(\frac{\pi}{3} - \frac{2}{\sqrt{3}}\right)r^2$ (*d*) $\left(\frac{\pi}{3} - \frac{4}{\sqrt{3}}\right)r^2$

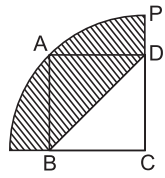
51. On increasing the diameter of a circle by 40%, its area is increased by

(*a*) 96% (*b*) 40% (*c*) 80% (*d*) 48%

52. The area enclosed between a circle and a rectangle of sides 4 cm and 3 cm inscribed in the circle [Taking $\pi = 3.14$] is

(*a*) 7.625 cm^2 (*b*) 7.5 cm^2 (*c*) 7.975 cm^2 (*d*) 7.3 cm^2

53. The quarter circles as shown has centre C and radius 10 units. If the perimeter of the rectangle ABCD is 26 units, then the perimeter of the shaded region is



(*a*) $(5\pi + 18)$ units (*b*) $(5\pi + 20)$ units

(*c*) $(5\pi + 19)$ units (*d*) $(5\pi + 17)$ units

54. If the areas of two concentric circles are 962.5 cm^2 and 1386 cm^2 respectively, then the width of the ring is

(*a*) 3.1 cm (*b*) 2.9 cm (*c*) 3.5 cm (*d*) 3.2 cm

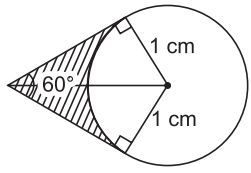
55. Area of sector of a circle bounded by an arc of length 6π cm is equal to 24π cm^2. Find the radius of the circle.

(*a*) 12 cm (*b*) 16 cm (*c*) 8 cm (*d*) 10 cm

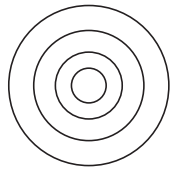
56. In the given figure, if the radius of the circle is 1 cm and $\angle A = 60°$, then the area of the shaded region is

(*a*) $\left(\sqrt{3} - \frac{\pi}{3}\right) cm^2$ (*b*) $\left(\sqrt{3} + \frac{\pi}{3}\right) cm^2$

(*c*) $\left(\frac{\pi}{\sqrt{3}} - 3\right) cm^2$ (*d*) $\left(\frac{\pi}{\sqrt{3}} + 3\right) cm^2$



57. The radius of a circle is 20 cm. It is divided into four parts of equal area by drawing three concentric circles inside it. Then the radius of the largest of the three concentric circles drawn is



(*a*) $10\sqrt{5}$ cm (*b*) $10\sqrt{3}$ cm

(*c*) 10 cm (*d*) $10\sqrt{2}$ cm

Chapter 15: Surface Areas and Volumes

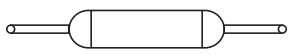
MULTIPLE-CHOICE QUESTIONS

For Basic and Standard Levels

Choose the correct answer from the given four options in the following questions:

1. The shape of a *belan* (rolling pin) as shown in the figure is the combination of

(*a*) three cylinders and two hemispheres
(*b*) three hemispheres and two cylinders
(*c*) a cylinder and two hemispheres
(*d*) two cylinders and two hemispheres



2. The edge of a cube whose volume is $8x^3$ is

(*a*) $4x$ (*b*) $2x$ (*c*) x (*d*) $\frac{x}{2}$

3. Total surface area of a cube is 216 cm^2, its volume is

(*a*) 144 cm^3 (*b*) 196 cm^3 (*c*) 212 cm^3 (*d*) 216 cm^3

[CBSE SP 2012]

4. If the diagonal of a cube is 17.32 cm, then its volume (taking $\sqrt{3}$ = 1.732) is

(*a*) 1000 cm^3 (*b*) 1732 cm^3 (*c*) 173.2 cm^3 (*d*) 10000 cm^3

5. The edge of a cube whose volume is equal to that of a cuboid of dimensions 8 cm × 4 cm × 2 cm is

(*a*) 6 cm (*b*) 4 cm (*c*) 2 cm (*d*) 8 cm

6. The maximum numbers of boxes of dimensions 8 cm × 7 cm × 6 cm that can be fitted in a box of dimensions 8 m × 7 m × 6 m is

(*a*) 10000000 (*b*) 100000
(*c*) 1000000 (*d*) 10000

7. If the volume of a 7 cm high right circular cylinder is 448 π cm^3, then the radius is equal to

(*a*) 10 cm (*b*) 4 cm (*c*) 6 cm (*d*) 8 cm

8. The curved surface area of a solid cylinder is one-third of its total surface area. If the radius of the cylinder is 2.5 cm, then its height is equal to

(*a*) 1.5 cm (*b*) 0.675 cm (*c*) 2 cm (*d*) 1.25 cm

9. The number of circular plates each of radius 7 cm and thickness 0.5 cm that should be placed one above the other to form a solid right circular cylinder of volume 1925 cm^3 is

(*a*) 25 (*b*) 50 (*c*) 12 (*d*) 75

10. Volume of a cylindrical wire of radius 1 cm is 440 cm^3. It is cut into three unequal segments. If the lengths of two cut segments are 6 cm and 8 cm, then the length of the third segment is

(*a*) 252 cm (*b*) 126 cm (*c*) 120 cm (*d*) 240 cm

11. If two cylinders of equal volumes have their radii in the ratio $\sqrt{2}$: 1, then the ratio of their heights is

(*a*) 1 : 1 (*b*) 1 : 2 (*c*) 1 : 4 (*d*) 1 : 3

12. If the surface area of a sphere is 144π, then its radius is

(*a*) 6 cm (*b*) 8 cm (*c*) 12 cm (*d*) 10 cm

13. If the ratio of the surface areas of two spheres is 4 : 9, then the ratio of their volumes is

(*a*) 16 : 81 (*b*) 4 : 9 (*c*) 2 : 3 (*d*) 8 : 27

14. If the volume of a hemisphere is 18π cm^3, then its radius is

(*a*) 12 cm (*b*) 3 cm (*c*) 6 cm (*d*) 4.5 cm

15. The volume of a cone is 1570 cm^3. If its base area is 314 cm^2, then its height is

(*a*) 10 cm (*b*) 20 cm (*c*) 18 cm (*d*) 15 cm

16. The radius of the largest right circular cone that can be cut out of a cube of volume 729 cm^3 is

(*a*) 4 cm (*b*) 4.5 cm (*c*) 3.5 cm (*d*) 3 cm

17. If two solid cones with same base radius 8 cm and height 15 cm are joined together along their bases, then the surface area of the shape so formed is

(*a*) 325π cm^2 (*b*) 272π cm^2 (*c*) 295π cm^2 (*d*) 300π cm^2

18. The ratio of the volumes of two cones is 1 : 4. If the ratio of their diameters is 4 : 5, then the ratio of their heights is

(*a*) 5 : 8 (*b*) 16 : 25 (*c*) 25 : 64 (*d*) 4 : 25

19. The curved surface area of one cone is twice that of the other cone. If the slant height of the latter is twice that of the former, then the ratio of their radii is

(*a*) 4 : 1 (*b*) 2 : 1 (*c*) 3 : 1 (*d*) 5 : 1

20. If three cubes each of edge '*a*' are joined together to form a cuboid, then the surface area of the cuboid is

(*a*) $11a^2$ (*b*) $9a^2$ (*c*) $14a^2$ (*d*) $7a^2$

21. The volume of the largest sphere that can be carved out of a cube of side 21 cm is

(*a*) 4410 cm^3 (*b*) 6615 cm^3

(*c*) 5292 cm^3 (*d*) 4851 cm^3

22. A cuboid and a right circular cylinder have equal volumes. Their heights are also equal. If '*r*' and '*h*' are respectively the radius of the base and height of the cylinder, then the area of the bottom of the cuboid is

(*a*) πr^2 (*b*) πr (*c*) πr^3 (*d*) πh^2

23. If the radius of the base of metallic solid right circular cylinder is 'r' and its height is 3 cm and it is melted and recast into a right circular cone of the same radius, then the height of the cone is

(a) 6 cm (b) 9 cm (c) 12 cm (d) 7.5 cm

24. The radii of bases of cylinder and a cone are in the ratio 3 : 4 and their heights are in the ratio 2 : 3, then ratio between the volume of cylinder to that of cone is

(a) 7 : 5 (b) 5 : 7 (c) 8 : 9 (d) 9 : 8 **[CBSE SP 2012]**

25. If a solid sphere of radius 8 cm is melted and recast into spherical balls each of radius 2 cm, then the number of spherical balls made is

(a) 32 (b) 24 (c) 64 (d) 16

26. The volume of a largest sphere that can be cut from cylindrical log of wood of base radius 1 m and height 4 m is

(a) $\frac{8}{3}\pi\ m^3$ (b) $\frac{10}{3}\ m^3$ (c) $\frac{16\pi}{3}\ m^3$ (d) $\frac{4}{3}\pi\ m^3$

[CBSE SP 2012]

27. If a solid sphere with total surface area 48 cm^2 is bisected into two hemispheres, then the total surface area of any one of the hemisphere is

(a) 48 cm^2 (b) 60 cm^2 (c) 24 cm^2 (d) 36 cm^2

28. A metallic hemisphere is melted and recast into a cone with the same base radius 'r' as that of the hemisphere. If the height of the cone is h, then value of $\frac{h}{r}$ is

(a) 2 (b) 1 (c) $\frac{1}{2}$ (d) 3

29. The radii of the ends of a frustum of a cone of a height h cm are r_1 cm and r_2 cm. The volume in cm^3 of the frustum of the cone is

(a) $\frac{1}{3}\pi h\,[r_1^2 - r_2^2 - r_1 r_2]$ (b) $\frac{1}{3}\pi r\,[r_1^2 + r_2^2 - r_1 r_2]$

(c) $\frac{1}{3}\pi h\,[r_1^2 - r_2^2 + r_1 r_2]$ (d) $\frac{1}{3}\pi h\,[r_1^2 + r_2^2 + r_1 r_2]$

30. During the conversion of a solid from one shape to another (assuming no wastage takes place) , the volume of the new shape will

(a) be doubled (b) remain unaltered

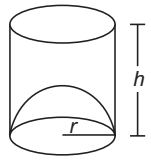
(c) be halved (d) increase

31. A solid is hemispherical at the bottom and conical (of same radius) above it. If the surface areas of two parts are equal, then the ratio of its radius and the slant height of the conical part is

(a) 1 : 4 (b) 4 : 1 (c) 2 : 1 (d) 1 : 2

[CBSE SP 2011]

32. The capacity of the cylindrical vessel with the hemispherical bottom portion raised upwards (as shown in the figure) is



(*a*) $\frac{\pi r^2}{3}[3h - 2r]$ (*b*) $\frac{\pi r^2}{3}[3h + 2r]$

(*c*) $\frac{\pi r^2}{2}[2h - 3r]$ (*d*) $\frac{\pi r^2}{2}[2h + 3r]$

33. If a solid right circular cone of height 24 cm and base radius 6 cm is melted and recast in the shape of a sphere, then the radius of the sphere is

(*a*) 6 cm (*b*) 4 cm (*c*) 8 cm (*d*) 12 cm **[CBSE SP 2012]**

34. The radii of the circular ends of a bucket of height 40 cm are 24 cm and 15 cm. The slant height (in cm) of the bucket is

(*a*) 51 (*b*) 49 (*c*) 41 (*d*) 43 **[CBSE 2012]**

35. The radii of the circular ends of a frustum are 6 cm and 14 cm. If its slant height is 10 cm, then its vertical height is

(*a*) 6 cm (*b*) 8 cm (*c*) 4 cm (*d*) 7 cm

36. A hollow cylindrical pipe is 21 cm long. If its outer and inner diameters are 10 cm and 6 cm respectively, then the volume of the metal used in making the pipe is $\left[\text{Take } \pi = \frac{22}{7}\right]$

(*a*) 1135 cm^3 (*b*) 1086 cm^3 (*c*) 1056 cm^3 (*d*) 1094 cm^3

For Standard Level

37. The curved surface area of a cone is 2310 cm^2. It its slant height is 35 cm, then its vertical height is

(*a*) 42 cm (*b*) 21 cm (*c*) 28 cm (*d*) 14 cm

38. If the height and base radius of a cone, each is increased by 50%, then the ratio between the volume of the given cone and the new cone is

(*a*) 8 : 27 (*b*) 27 : 8 (*c*) 4 : 9 (*d*) 2 : 3

39. The radius of the base and height of a cone are 4 cm and 9 cm respectively. If its height is decreased and base radius is increased each by 2 cm, then the ratio of the volume of the new cone to that of the original cone is

(*a*) 5 : 2 (*b*) 7 : 4 (*c*) 9 : 2 (*d*) 8 : 3

40. If the perimeters of the bases of two right circular cones are in the ratio 3 : 4 and their volumes are in the ratio 9 : 32, then the ratio of their heights is

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

41. A cuboidal ice cream brick of dimensions 22 cm × 20 cm × 16 cm is to be distributed among some children by filling ice cream cones of radius 2 cm and height 7 cm up to its brim. How many children will get the ice cream cones?

(*a*) 252 (*b*) 240 (*c*) 285 (*d*) 236

42. If a conical cavity of height 8 cm and base radius 6 cm is hollowed out from a solid cylinder whose height is 8 cm and base radius is 6 cm, then the approximate volume of the remaining solid is

(*a*) 695.4 cm^3 (*b*) 700.5 cm^3

(*c*) 683.4 cm^3 (*d*) 603.4 cm^3

43. The radii of the internal and external surfaces of a hollow spherical shell are 3 cm and 5 cm respectively. If it is melted and recast into a solid cylinder of height $\frac{8}{3}$ cm, then the diameter of the cylinder is

(*a*) 28 cm (*b*) 21 cm (*c*) 7 cm (*d*) 14 cm

44. Fifteen solid spheres of the same size are made by melting a solid metallic cylinder of base diameter 2 cm and height 20 cm. The diameter of each sphere is

(*a*) 1 cm (*b*) 3 cm (*c*) 2 cm (*d*) 2.5 cm

45. The volume of the largest possible sphere carved out from a cube of 7 cm side is approximately equal to

(*a*) 195.7 cm^3 (*b*) 214 cm^3 (*c*) 189.8 cm^3 (*d*) 179.7 cm^3

46. The slant height of a frustum of a cone is 4 cm and the perimeters of its circular ends are 18 cm and 6 cm. Then, the curved surface area of the frustum is

(*a*) 48 cm^2 (*b*) 90 cm^2 (*c*) 96 cm^2 (*d*) 45 cm^2

47. A conical tent with base radius 7 m and height 24 m is made from 5 m wide canvas. The length of the canvas used is

(*a*) 115 m (*b*) 110 m (*c*) 95 m (*d*) 100 m

48. If the volume of a hemisphere is 19404 cm^3, then the total surface area of the hemisphere is

(*a*) 4168 cm^2 (*b*) 4062 cm^2 (*c*) 4000 cm^2 (*d*) 4158 cm^2

49. If the radius of the base of a right circular cylinder is halved, keeping the height same, then the ratio of the volume of the cylinder thus obtained to the volume of the original cylinder is

(*a*) 1 : 2 (*b*) 2 : 1 (*c*) 1 : 4 (*d*) 4 : 1 **[CBSE 2012]**

50. A tent is in the shape of a right circular cylinder up to a height of 3 m and conical above it. The total height of the tent is 13.5 m and radius of the base is 14 m. Then, its curved surface area is

(*a*) 325π m^2 (*b*) 350π m^2 (*c*) 375π m^2 (*d*) 329π m^2

51. If a cone is cut into two parts by a horizontal plane passing through the mid-point of its axis, then the ratio of the volumes of the upper part and the cone is

(*a*) 1 : 8 (*b*) 1 : 5 (*c*) 1 : 7 (*d*) 1 : 6 **[CBSE 2012]**

52. A canal is 300 cm wide and 120 cm deep. The water in the canal is flowing with a speed of 20 km/h. If 8 cm of standing water is desired then the area irrigated in 20 minutes will be

(*a*) 40.5 hectares (*b*) 40 hectares (*c*) 30 hectares (*d*) 30.8 hectares.

53. Marbles of diameter 1.4 cm are dropped into a cylindrical beaker of radius 3.5 cm containing some water. The number of marbles that should be dropped into the beaker so that the water level rises by 2.8 cm is

(*a*) 57 (*b*) 74 (*c*) 58 (*d*) 75

54. A solid is hemispherical at the bottom and conical above. If the surface areas of the two parts are equal, then the ratio of its radius and the height of its conical part is

(*a*) $1 : \sqrt{2}$ (*b*) $\sqrt{2} : 1$ (*c*) $1 : \sqrt{3}$ (*d*) $\sqrt{3} : 1$

55. The ratio of lateral surface area to the total surface area of a cylinder with base diameter 1.6 m and height 20 cm is

(*a*) 1 : 7 (*b*) 1 : 5

(*c*) 7 : 1 (*d*) 5 : 1

56. If three cubes of same metal whose edges are 6 cm, 8 cm and 10 cm melted and formed into a single cube, then the diagonal of the larger cube formed is

(*a*) $4\sqrt{3}$ cm (*b*) $15\sqrt{3}$ cm (*c*) $12\sqrt{3}$ cm (*d*) $11\sqrt{3}$ cm

57. A solid is in the shape of a cone fixed on a hemisphere with both their radii equal to 2 cm. If the height of the cone is equal to its radius, then the volume of the solid is

(*a*) 8π cm^3 (*b*) 10 cm^3 (*c*) 16π cm^3 (*d*) 12π cm^3

58. The diameter of a sphere is 6 cm. It is melted and drawn into a wire of diameter 2 mm. The length of the wire is

(*a*) 36 m (*b*) 32 m (*c*) 38 m (*b*) 34 m

59. A solid consists of a circular cylinder surmounted by a right circular cone. The height of the cone is h. If the total volume of the solid is 3 times the volume of the cone, then the height of the circular cylinder is

(*a*) $2h$ (*b*) $\frac{3}{2}h$ (*c*) $\frac{h}{2}$ (*d*) $\frac{2h}{3}$

60. A solid is hemispherical at the bottom and conical above. If the surface areas of the two parts are equal, then the ratio of its radius and the height of its conical part is

(*a*) $1 : \sqrt{2}$ (*b*) $\sqrt{2} : 1$ (*c*) $1 : \sqrt{3}$ (*d*) $\sqrt{3} : 1$

Chapter 16: **Statistics**

MULTIPLE-CHOICE QUESTIONS

For Basic and Standard Levels

Choose the correct answer from the given four options in the following questions:

1. Which of the following is not a measure of central tendency?
(*a*) Mean (*b*) Median (*c*) Mode (*d*) Standard deviation

2. The arithmetic mean of x, $x + 3$, $x + 6$, $x + 9$ and $x + 12$ is
(*a*) $x + 6$ (*b*) $x + 5$ (*c*) $x + 7$ (*d*) $x + 8$

3. If the arithmetic mean of 2, 4, 6, 8, 3 and 7 is 5, then the arithmetic mean of 102, 104, 106, 108, 103 and 107 is
(*a*) 104 (*b*) 102 (*c*) 105 (*d*) 103

4. The arithmetic mean of 1, 2, 3, 4, … , n is
(*a*) $\frac{n}{2}$ (*b*) $\frac{n+1}{2}$ (*c*) $\frac{n-1}{2}$ (*d*) $\frac{n}{2} + 1$

5. The class marks of classes 10 – 25 and 35 – 55 respectively are **[CBSE 2008]**
(*a*) 16, 45.5 (*b*) 16.5, 44.5 (*c*) 17.5, 45 (*d*) 17, 44

6. While computing the mean of group data, it is assumed that the frequencies are
(*a*) centred at the lower limits of the classes
(*b*) centred at the upper limits of the classes
(*c*) evenly distributed over all the classes
(*d*) centred at the class marks of the classes

7. In the formula $\bar{x} = a + \frac{\sum f_i d_i}{\sum f_i}$, for finding the mean of the grouped data, d_is are the deviation from a of
(*a*) mid-points of the classes (*b*) lower limits of the classes
(*c*) upper limits of the classes (*d*) frequencies of the class marks

8. In the formula $\bar{x} = a + h \frac{\sum f_i u_i}{\sum f_i}$, for finding the mean of grouped frequency distribution u_i is equal to
(*a*) $\frac{x_i + a}{h}$ (*b*) $\frac{x_i - a}{h}$ (*c*) $h\,(x_i - a)$ (*d*) $h\,(x_i + a)$

9. Mode is the value of the variable which has
(*a*) minimum frequency (*b*) mean frequency
(*c*) maximum frequency (*d*) middle most frequency

10. If the mode of the data: 64, 60, 48, x, 43, 48, 43, 34 is 43, then $x + 2$ is equal to

(a) 43 (b) 45 (c) 48 (d) 60

11. The measure(s) of central tendency that would be best suited to determine the consumer item in demand is

(a) mean (b) median

(c) mode (d) mean and median

12. The wickets taken by a bowler in 15 cricket matches are as follows:

1, 3, 2, 0, 3, 4, 3, 2, 5, 1, 2, 2, 1, 0, 2. Then the mode of the data is

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

13. If the median of the data: 6, 7, $x - 2$, x, 17 and 20 written in increasing order is 16, then the value of x is

(a) 18 (b) 15 (c) 16 (d) 17

14. For the following data:

Marks: 0, 0, 0, 1, 2, 2, 3, 3, 3, 4, 5, 5, 5, 5, 6, 6, 7, 8 the median and mode are respectively

(a) 4, 3 (b) 3.5, 5 (c) 4.5, 4 (d) 5, 6

15. Out of twenty students, who appeared in a test, eight secured less than 35 marks and eight secured more than 70 marks. If the marks secured by the remaining four students are 39, 51, 69 and 43, then the median marks of the whole data are

(a) 49 (b) 47 (c) 51 (d) 48

16. If a variable takes discrete values, $x + 4$, $x - \frac{7}{2}$, $x - \frac{5}{2}$, $x - 3$, $x - 2$, $x + \frac{1}{2}$, $x - \frac{1}{2}$, $x + 5$; $x > 0$, then the median of the data is

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

17. If the median of the given data: 24, 25, 26, $x + 2$, $x + 3$, 30, 31, 34 is 27.5, then the value of x is

(a) 27 (b) 28 (c) 25 (d) 30

18. For the frequency distribution table given below, write the median class.

Class interval	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
Frequency	6	8	7	9	14
Cumulative frequency	6	14	21	30	44

(a) 20 – 30 (b) 30 – 40 (c) 40 – 50 (d) 0 – 10

19. For the following frequency distribution

Class	30 – 35	35 – 40	40 – 45	45 – 50	50 – 55	55 – 60	60 – 65
Frequency	14	16	18	23	18	8	3

the difference of the upper limit of the median class and the lower limit of the modal class is

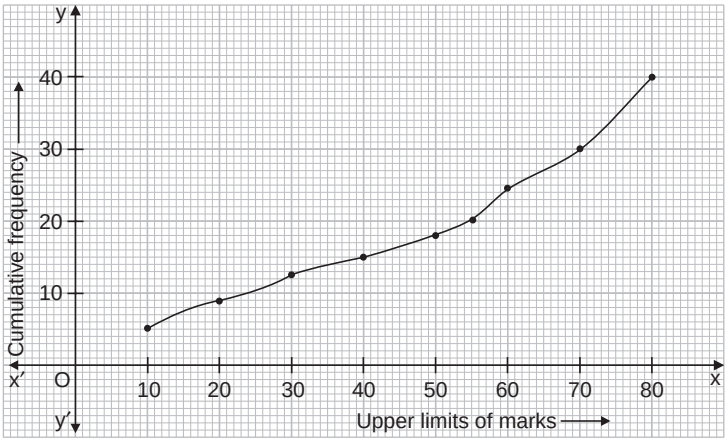
(*a*) 20 (*b*) 15 (*c*) 5 (*d*) 10

20. The median of a given frequency distribution is found graphically with the help of

(*a*) frequency curve (*b*) frequency polygon

(*c*) histogram (*d*) an ogive

21. A student draws a cumulative frequency curve for the marks obtained by 40 students of a class as shown. The median marks obtained by the students of the class are



(*a*) 55 (*b*) 45 (*c*) 50 (*d*) 60

22. If the mode of some data is 7 and their mean is also 7, then their median is

(*a*) 10 (*b*) 9 (*c*) 8 (*d*) 7

23. If the median and mode of a data are 52 and 52.4 respectively, then its mean is

(*a*) 51.6 (*b*) 52.2 (*c*) 52 (*d*) 51.8

24. If $\sum f_i x_i = 132 + 5p$, $\sum f_i = 20$ and the mean of the distribution is 8.1, then the value of p is

(*a*) 3 (*b*) 6 (*c*) 4 (*d*) 5

25. The median of first 10 prime numbers is

(*a*) 13 (*b*) 14 (*c*) 12 (*d*) 11

For Standard Level

26. The mean of n observations is $\bar{x}$. If the first observation is increased by 1, the second by 2, the third by 3, and so on, then the new mean is

(*a*) $\bar{x} + 2(n+1)$ (*b*) $\bar{x} + \frac{n+1}{2}$ (*c*) $\bar{x} + (n+1)$ (*d*) $\bar{x} - \frac{(n+1)}{2}$

27. The mean monthly salary of 10 members of a group is ₹ 1445. If one more member whose monthly salary is ₹ 1500 joins the group, then the mean monthly salary (in ₹) of 11 members of the group is

(*a*) ₹ 1450 (*b*) ₹ 1460 (*c*) ₹ 1470 (*d*) ₹ 1480

28. The mean of 6 numbers is 16. With the removal of a number the mean of remaining numbers is 17. The number removed is

(*a*) 2 (*b*) 22 (*c*) 11 (*d*) 6 **[CBSE SP 2011]**

29. If 89 is added to the given data: 45, 49, 52, 53, 67, 77, 81, 99, then the median increases by

(*a*) 8 (*b*) 7 (*c*) 6 (*d*) 5

30. The marks obtained by 60 students are tabulated below.

Marks	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	Total
Number of students	2	10	25	20	3	60

The number of students who got less than 30 marks is equal to

(*a*) 37 (*b*) 35 (*c*) 57 (*d*) 45

31. Consider the following frequency distribution:

Height (in cm)	Less than 140	Less than 145	Less than 150	Less than 155	Less than 160	Less than 165
Number of girls	4	11	29	40	46	51

The lower limit of the modal class is

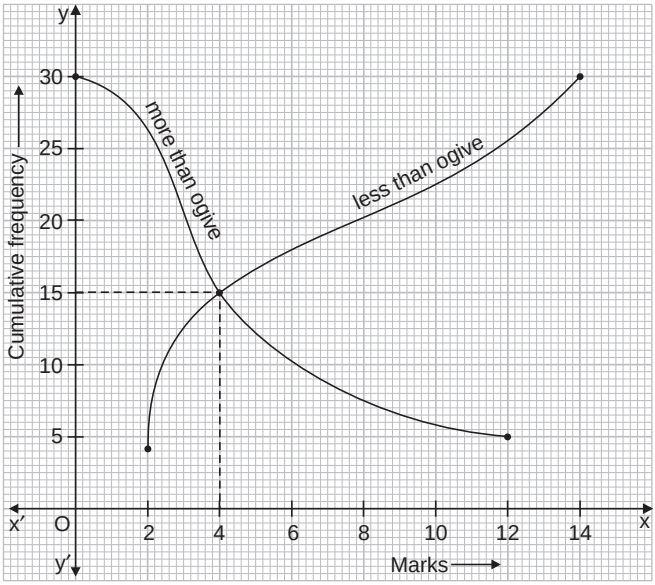
(*a*) 140 (*b*) 150 (*c*) 160 (*d*) 145

32. Which measure of central tendency is given by the *x*-coordinate of the point of intersection of 'more than ogive' and 'less than ogive'? **[CBSE 2008]**

(*a*) Mean (*b*) Median (*c*) Mode (*d*) Mean and Mode

33. Using the graph in the figure of 'less than ogive' and 'more than ogive', the median of the data is

(*a*) 12 (*b*) 30 (*c*) 4 (*d*) 15



34. In a graphical representation if p times the distance between the median and mean is twice the distance between mode and mean, then the value of p is

(*a*) 5 (*b*) 2 (*c*) 6 (*d*) 3

35. The mean of 11 observations is 30. If the mean of the first 6 observations is 28 and that of the last 6 observations is 32, then the 6th number is equal to

(*a*) 32 (*b*) 29

(*c*) 30 (*d*) 31

36. The mode of the distribution

Class interval	0 – 20	20 – 40	40 – 60	60 – 80
Frequency	15	6	18	10

is

(*a*) 54 (*b*) 52 (*c*) 50 (*d*) 53

37. Find the median of the following distribution.

Class interval	0 – 8	8 – 16	16 – 24	24 – 32	32 – 40	40 – 48
Frequency	8	10	16	24	15	7

(*a*) 29 (*b*) 30 (*c*) 26 (*d*) 28

38. The mean of 1, 3, 4, 5, 7 and 4 is m. The numbers 3, 2, 2, 4, 3, 3 and p have mean $m - 1$ and median q. Then $p + q$ is

(*a*) 4 (*b*) 5 (*c*) 6 (*d*) 7

39. The sum of deviations of a set of values $x_1, x_2, x_3, \ldots, x_n$ measured from 50 is – 10 and the sum of deviations of the values from 46 is 70. Then, the value of n is equal to

(*a*) 25 (*b*) 20 (*c*) 22 (*d*) 18

40.

Class interval	0 – 10	10 – 30	30 – 60	60 – 80	80 – 90
Frequency	5	15	30	y	2
Cumulative frequency	x	20	50	58	z

The unknown entries x, y and z in the distribution given above are

(*a*) $x = 15, y = 20, z = 56$. (*b*) $x = 5, y = 8, z = 60$.

(*c*) $x = 10, y = 28, z = 20$. (*d*) $x = 20, y = 10, z = 50$.

Chapter 17: **Probability**

MULTIPLE-CHOICE QUESTIONS

For Basic and Standard Levels

Choose the correct answer from the given four options in the following questions:

1. Which of the following cannot be the probability of an event?

(*a*) 1.5 (*b*) $\frac{3}{5}$ (*c*) 25% (*d*) 0.3

2. If an event is very unlikely to happen, then its probability is closest to

(*a*) 0.1 (*b*) 0.0001 (*c*) 0.1 (*d*) 0.001

3. In a family of 3 children, the probability of having at least one boy is

(*a*) $\frac{7}{8}$ (*b*) $\frac{1}{8}$ (*c*) $\frac{5}{8}$ (*d*) $\frac{3}{4}$ **[CBSE 2014]**

4. If a die is thrown once, the probability of getting a perfect square is

(*a*) $\frac{1}{3}$ (*b*) $\frac{1}{4}$ (*c*) $\frac{2}{3}$ (*d*) $\frac{3}{4}$

5. From a well-shuffled pack of cards, a card is drawn at random. Find the probability of getting a black queen.

(*a*) $\frac{3}{26}$ (*b*) $\frac{2}{13}$ (*c*) $\frac{1}{13}$ (*d*) $\frac{1}{26}$ **[CBSE 2008]**

6. A card is drawn from a deck of 52 cards. The event E is that card is not a king of spades. The number of outcomes favourable to E are

(*a*) 26 (*b*) 51 (*c*) 41 (*d*) 13

7. A card is drawn from a well-shuffled deck of 52 cards. The probability that the card will not be an ace is

(*a*) $\frac{1}{13}$ (*b*) $\frac{1}{4}$ (*c*) $\frac{12}{13}$ (*d*) $\frac{3}{4}$ **[CBSE 2011]**

8. The probability that a number selected at random from the numbers 1, 2, 3, ..., 15 is a multiple of 4 is

(*a*) $\frac{4}{15}$ (*b*) $\frac{2}{15}$

(*c*) $\frac{1}{5}$ (*d*) $\frac{1}{3}$ **[CBSE 2014]**

9. The probability of drawing a red card or a king from a standard deck of well-shuffled 52 cards is

(*a*) $\frac{5}{13}$ (*b*) $\frac{7}{13}$ (*c*) $\frac{11}{13}$ (*d*) $\frac{9}{13}$

10. If a letter is drawn at random from the letters in word 'ERROR', then the letters which have equal probability of being drawn are

(*a*) E and O (*b*) R and E (*c*) O and R (*d*) E, R and O

11. From the data (1, 4, 9, 16, 25, 29) if 29 is removed, then the probability of getting a number which is neither a prime nor a composite is

(*a*) $\frac{2}{5}$ (*b*) $\frac{1}{5}$ (*c*) $\frac{3}{5}$ (*d*) $\frac{4}{5}$

12. A game of chance consists of spinning an arrow which comes to rest pointing at one of the numbers 1, 2, 3, 4, 5, 6 , 7, 8 and these are equally likely outcomes. Then, the probability that it will point at a prime number is

(*a*) $\frac{1}{8}$ (*b*) $\frac{5}{8}$ (*c*) $\frac{3}{8}$ (*d*) $\frac{1}{2}$

13. It is given that in a group of three students, the probability of two students not having the same birthday is 0.991. Then, the probability of the two students having the same birthday is

(*a*) 0.009 (*b*) 0.001 (*c*) 0.990 (*d*) 0.007

14. If the probability of success is 38%, then the probability of failure is

(*a*) 38% (*b*) 62% (*c*) 52% (*d*) 68%

15. In a flower bed, every third plant is a rose plant. If a child picks a flower, then the probability of the flower being other than rose is

(*a*) $\frac{1}{5}$ (*b*) $\frac{1}{3}$ (*c*) $\frac{2}{3}$ (*d*) $\frac{2}{5}$

16. The probability of getting an even number, when a die is thrown once, is

(*a*) $\frac{1}{2}$ (*b*) $\frac{1}{3}$ (*c*) $\frac{1}{6}$ (*d*) $\frac{5}{6}$ **[CBSE 2013]**

17. Many birds were sitting on a tree. Every seventh bird was a sparrow. A bird flew away. What is the probability that the bird was not a sparrow?

(*a*) $\frac{5}{7}$ (*b*) $\frac{3}{7}$ (*c*) $\frac{6}{7}$ (*d*) $\frac{1}{7}$

18. 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*) $\frac{1}{45}$ (*b*) $\frac{2}{15}$ (*c*) $\frac{1}{9}$ (*d*) $\frac{4}{45}$ **[CBSE 2013]**

19. A box contains 90 discs, numbered from 1 to 90. If one disc is drawn at random from the box, the probability that it bears a prime number less than 23 is

(*a*) $\frac{7}{90}$ (*b*) $\frac{10}{90}$ (*c*) $\frac{4}{45}$ (*d*) $\frac{9}{89}$ **[CBSE 2013]**

20. If three unbiased coins are tossed, then the probability of getting either three heads or three tails is

(*a*) $\frac{3}{4}$ (*b*) $\frac{1}{4}$ (*c*) $\frac{1}{3}$ (*d*) $\frac{2}{3}$

21. Two friends were born in the year 2000. What is the probability that they have the same birthday?

(*a*) $\frac{1}{365}$ (*b*) $\frac{1}{366}$ (*c*) $\frac{2}{365}$ (*d*) $\frac{1}{183}$ **[CBSE 2008 C]**

22. A box contains 3 blue, 2 white and 4 red marbles. If a marble is drawn at random from the box, what is the probability that it will not be a white marble?

(*a*) $\frac{1}{3}$ (*b*) $\frac{4}{9}$ (*c*) $\frac{7}{9}$ (*d*) $\frac{2}{9}$ **[CBSE 2009 C]**

23. A bag contains 4 red balls and 6 black balls. If a ball is taken out at random, find the probability of getting a black ball is

(*a*) $\frac{3}{5}$ (*b*) $\frac{1}{5}$ (*c*) $\frac{2}{5}$ (*d*) $\frac{4}{5}$ **[CBSE 2008]**

24. The probability of getting a bad egg in a lot of 500 is 0.028. Then, the number of good eggs in the lot is

(*a*) 480 (*b*) 486 (*c*) 591 (*d*) 490

25. A girl calculates that the probability of her winning the first prize in a lottery is 0.025. If 5000 tickets are sold, then the number of tickets bought by her is

(*a*) 75 (*b*) 50 (*c*) 125 (*d*) 25

For Standard Level

26. A pack of cards is shuffled well after all the face cards have been removed. Then, the probability of drawing a non-red ace from the new pack is

(*a*) $\frac{1}{13}$ (*b*) $\frac{1}{20}$ (*c*) $\frac{1}{36}$ (*d*) $\frac{2}{13}$

27. Two dice are thrown together. The probability of getting the same number on both the dice is

(*a*) $\frac{1}{2}$ (*b*) $\frac{1}{3}$ (*c*) $\frac{1}{6}$ (*d*) $\frac{1}{12}$ **[CBSE 2012]**

28. In a single throw of two dice, the probability of getting 6 as a product is

(*a*) $\frac{4}{9}$ (*b*) $\frac{2}{9}$ (*c*) $\frac{1}{9}$ (*d*) $\frac{5}{9}$

29. The probability of guessing the correct answer to a certain question is $\frac{x}{y}$. If the probability of not guessing the correct answer to this questions is $\frac{2}{3}$, then

(*a*) $y = 4x$ (*b*) $y = 3x$

(*c*) $y = 2x$ (*d*) $y = x$

30. 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

31. A school has five houses A, B, C, D and E. A class has 48 students, 9 from house A, 13 from house B, 10 from house C, 7 from house D and the rest are from house E. A single student is selected at random to be the class monitor. The probability that the selected student is not from D and E is

(*a*) $\frac{1}{4}$ (*b*) $\frac{1}{3}$ (*c*) $\frac{2}{3}$ (*d*) $\frac{2}{5}$

32. Two dice are thrown at the same time. The probability of getting the difference of the numbers on the two dice equal to 2 is

(*a*) $\frac{2}{9}$ (*b*) $\frac{1}{3}$ (*c*) $\frac{4}{9}$ (*d*) $\frac{5}{9}$

33. If a coin is tossed two times, then the probability of getting at most one head is

(*a*) $\frac{3}{4}$ (*b*) $\frac{1}{4}$ (*c*) $\frac{1}{2}$ (*d*) $\frac{3}{8}$

34. If a coin is tossed three times, then the probability of getting at most 2 heads is

(*a*) $\frac{5}{8}$ (*b*) $\frac{3}{8}$ (*c*) $\frac{7}{8}$ (*d*) $\frac{3}{4}$

35. Two customers visit a particular shop in the same week (Tuesday to Saturday). Each is equally likely to visit the shop on any one day as on another. The probability that both will visit the shop on two consecutive days is

(*a*) $\frac{11}{25}$ (*b*) $\frac{8}{25}$ (*c*) $\frac{7}{25}$ (*d*) $\frac{9}{25}$

[**Hint:** Favourable cases are T W, W T, W Th, Th W, Th F, F Th, F S, S F]

ANSWERS

CHAPTER 1

1. (*b*)	**2.** (*c*)	**3.** (*d*)	**4.** (*b*)	**5.** (*c*)	**6.** (*a*)
7. (*b*)	**8.** (*b*)	**9.** (*b*)	**10.** (*a*)	**11.** (*d*)	**12.** (*b*)
13. (*a*)	**14.** (*b*)	**15.** (*b*)	**16.** (*d*)	**17.** (*a*)	**18.** (*b*)
19. (*c*)	**20.** (*c*)	**21.** (*c*)	**22.** (*c*)	**23.** (*c*)	**24.** (*c*)
25. (*b*)	**26.** (*c*)	**27.** (*b*)	**28.** (*b*)	**29.** (*b*)	**30.** (*d*)
31. (*d*)	**32.** (*b*)	**33.** (*d*)	**34.** (*c*)	**35.** (*c*)	**36.** (*b*)
37. (*b*)	**38.** (*b*)	**39.** (*c*)	**40.** (*a*)	**41.** (*b*)	**42.** (*b*)
43. (*c*)	**44.** (*d*)	**45.** (*b*)	**46.** (*a*)	**47.** (*b*)	**48.** (*b*)
49. (*b*)	**50.** (*d*)	**51.** (*d*)	**52.** (*d*)	**53.** (*c*)	**54.** (*b*)
55. (*b*)	**56.** (*c*)	**57.** (*d*)	**58.** (*a*)		

CHAPTER 2

1. (*c*)	**2.** (*c*)	**3.** (*b*)	**4.** (*b*)	**5.** (*b*)	**6.** (*c*)
7. (*c*)	**8.** (*b*)	**9.** (*b*)	**10.** (*a*)	**11.** (*b*)	**12.** (*c*)
13. (*c*)	**14.** (*b*)	**15.** (*c*)	**16.** (*d*)	**17.** (*c*)	**18.** (*a*)
19. (*b*)	**20.** (*b*)	**21.** (*b*)	**22.** (*a*)	**23.** (*a*)	**24.** (*a*)
25. (*a*)	**26.** (*b*)	**27.** (*a*)	**28.** (*c*)	**29.** (*c*)	**30.** (*c*)
31. (*d*)	**32.** (*b*)	**33.** (*d*)	**34.** (*d*)	**35.** (*c*)	**36.** (*b*)
37. (*b*)	**38.** (*d*)				

CHAPTER 3

1. (*c*)	**2.** (*d*)	**3.** (*d*)	**4.** (*b*)	**5.** (*c*)	**6.** (*d*)
7. (*d*)	**8.** (*c*)	**9.** (*a*)	**10.** (*a*)	**11.** (*a*)	**12.** (*b*)
13. (*c*)	**14.** (*c*)	**15.** (*b*)	**16.** (*c*)	**17.** (*b*)	**18.** (*c*)
19. (*d*)	**20.** (*c*)				

CHAPTER 4

1. (*c*)	**2.** (*b*)	**3.** (*a*)	**4.** (*b*)	**5.** (*b*)	**6.** (*c*)
7. (*c*)	**8.** (*a*)	**9.** (*b*)	**10.** (*d*)	**11.** (*b*)	**12.** (*a*)
13. (*d*)	**14.** (*a*)	**15.** (*a*)	**16.** (*b*)	**17.** (*a*)	**18.** (*a*)
19. (*b*)	**20.** (*b*)	**21.** (*a*)	**22.** (*a*)	**23.** (*c*)	**24.** (*d*)
25. (*d*)	**26.** (*c*)	**27.** (*c*)	**28.** (*b*)	**29.** (*a*)	**30.** (*b*)
31. (*b*)	**32.** (*b*)	**33.** (*d*)	**34.** (*a*)	**35.** (*c*)	**36.** (*b*)
37. (*b*)	**38.** (*d*)	**39.** (*b*)	**40.** (*b*)	**41.** (*d*)	**42.** (*a*)
43. (*b*)	**44.** (*c*)				

CHAPTER 5

1. (*c*)	**2.** (*b*)	**3.** (*d*)	**4.** (*c*)	**5.** (*c*)	**6.** (*b*)
7. (*c*)	**8.** (*b*)	**9.** (*b*)	**10.** (*b*)	**11.** (*d*)	**12.** (*b*)
13. (*c*)	**14.** (*b*)	**15.** (*b*)	**16.** (*d*)	**17.** (*a*)	**18.** (*d*)
19. (*b*)	**20.** (*c*)	**21.** (*c*)	**22.** (*b*)	**23.** (*b*)	**24.** (*c*)
25. (*b*)	**26.** (*b*)	**27.** (*c*)	**28.** (*c*)	**29.** (*c*)	**30.** (*b*)
31. (*c*)	**32.** (*b*)	**33.** (*c*)	**34.** (*b*)	**35.** (*d*)	**36.** (*b*)
37. (*b*)	**38.** (*d*)	**39.** (*d*)	**40.** (*a*)	**41.** (*d*)	**42.** (*c*)
43. (*b*)	**44.** (*d*)	**45.** (*b*)	**46.** (*d*)	**47.** (*b*)	**48.** (*b*)
49. (*c*)	**50.** (*b*)	**51.** (*b*)	**52.** (*d*)	**53.** (*b*)	**54.** (*b*)
55. (*c*)	**56.** (*a*)	**57.** (*c*)	**58.** (*d*)	**59.** (*b*)	**60.** (*d*)
61. (*a*)	**62.** (*c*)	**63.** (*c*)	**64.** (*a*)	**65.** (*c*)	

CHAPTER 6

1. (*b*)	**2.** (*b*)	**3.** (*c*)	**4.** (*b*)	**5.** (*c*)	**6.** (*b*)
7. (*d*)	**8.** (*a*)	**9.** (*a*)	**10.** (*c*)	**11.** (*b*)	**12.** (*d*)
13. (*c*)	**14.** (*d*)	**15.** (*b*)	**16.** (*d*)	**17.** (*d*)	**18.** (*d*)
19. (*d*)	**20.** (*c*)	**21.** (*d*)	**22.** (*b*)	**23.** (*c*)	**24.** (*b*)
25. (*d*)	**26.** (*c*)	**27.** (*a*)	**28.** (*c*)	**29.** (*b*)	**30.** (*b*)
31. (*d*)	**32.** (*b*)	**33.** (*c*)	**34.** (*d*)	**35.** (*a*)	**36.** (*c*)
37. (*c*)	**38.** (*c*)	**39.** (*b*)	**40.** (*b*)	**41.** (*d*)	**42.** (*c*)
43. (*d*)	**44.** (*b*)	**45.** (*b*)	**46.** (*c*)	**47.** (*d*)	**48.** (*d*)
49. (*b*)	**50.** (*c*)				

CHAPTER 7

1. (*b*)	**2.** (*c*)	**3.** (*b*)	**4.** (*c*)	**5.** (*b*)	**6.** (*b*)
7. (*c*)	**8.** (*b*)	**9.** (*c*)	**10.** (*d*)	**11.** (*b*)	**12.** (*c*)
13. (*c*)	**14.** (*b*)	**15.** (*b*)	**16.** (*d*)	**17.** (*a*)	**18.** (*b*)
19. (*a*)	**20.** (*d*)	**21.** (*a*)	**22.** (*c*)	**23.** (*d*)	**24.** (*c*)
25. (*b*)	**26.** (*c*)	**27.** (*a*)	**28.** (*c*)	**29.** (*c*)	**30.** (*b*)
31. (*b*)	**32.** (*b*)	**33.** (*a*)	**34.** (*a*)	**35.** (*b*)	**36.** (*c*)
37. (*b*)	**38.** (*a*)	**39.** (*c*)	**40.** (*b*)	**41.** (*b*)	**42.** (*c*)
43. (*a*)	**44.** (*b*)	**45.** (*c*)			

CHAPTER 8

1. (*c*)	**2.** (*a*)	**3.** (*d*)	**4.** (*c*)	**5.** (*b*)	**6.** (*c*)
7. (*d*)	**8.** (*a*)	**9.** (*a*)	**10.** (*a*)	**11.** (*d*)	**12.** (*a*)
13. (*c*)	**14.** (*b*)	**15.** (*b*)	**16.** (*b*)	**17.** (*c*)	**18.** (*c*)
19. (*a*)	**20.** (*a*)	**21.** (*d*)	**22.** (*c*)	**23.** (*a*)	**24.** (*c*)
25. (*c*)	**26.** (*c*)	**27.** (*b*)	**28.** (*d*)	**29.** (*a*)	**30.** (*b*)

31. (*d*) **32.** (*b*) **33.** (*c*) **34.** (*d*) **35.** (*b*) **36.** (*a*)
37. (*a*) **38.** (*d*) **39.** (*b*) **40.** (*b*)

CHAPTER 9

1. (*c*) **2.** (*b*) **3.** (*d*) **4.** (*c*) **5.** (*c*) **6.** (*c*)
7. (*c*) **8.** (*b*) **9.** (*a*) **10.** (*c*) **11.** (*c*) **12.** (*b*)
13. (*b*) **14.** (*b*) **15.** (*a*) **16.** (*b*) **17.** (*a*) **18.** (*b*)
19. (*c*) **20.** (*a*)

CHAPTER 10

1. (*c*) **2.** (*b*) **3.** (*a*) **4.** (*b*) **5.** (*b*) **6.** (*c*)
7. (*c*) **8.** (*c*) **9.** (*b*) **10.** (*c*) **11.** (*c*) **12.** (*b*)
13. (*b*) **14.** (*d*) **15.** (*a*) **16.** (*c*) **17.** (*a*) **18.** (*d*)
19. (*a*) **20.** (*d*) **21.** (*b*) **22.** (*d*) **23.** (*b*) **24.** (*d*)
25. (*b*)

CHAPTER 11

1. (*c*) **2.** (*b*) **3.** (*a*) **4.** (*d*) **5.** (*a*) **6.** (*b*)
7. (*c*) **8.** (*b*) **9.** (*b*) **10.** (*c*) **11.** (*b*) **12.** (*a*)
13. (*a*) **14.** (*c*) **15.** (*b*) **16.** (*a*) **17.** (*a*) **18.** (*b*)
19. (*c*) **20.** (*d*) **21.** (*b*) **22.** (*b*) **23.** (*c*) **24.** (*b*)
25. (*c*) **26.** (*b*) **27.** (*b*) **28.** (*b*) **29.** (*c*) **30.** (*c*)

CHAPTER 12

1. (*b*) **2.** (*b*) **3.** (*c*) **4.** (*b*) **5.** (*d*) **6.** (*b*)
7. (*c*) **8.** (*c*) **9.** (*a*) **10.** (*a*) **11.** (*b*) **12.** (*b*)
13. (*b*) **14.** (*d*) **15.** (*d*) **16.** (*a*) **17.** (*c*) **18.** (*a*)
19. (*c*) **20.** (*d*) **21.** (*a*) **22.** (*b*) **23.** (*c*) **24.** (*b*)
25. (*a*) **26.** (*a*) **27.** (*b*) **28.** (*c*) **29.** (*b*) **30.** (*a*)
31. (*d*) **32.** (*d*) **33.** (*d*) **34.** (*c*) **35.** (*d*) **36.** (*a*)
37. (*c*) **38.** (*b*) **39.** (*b*) **40.** (*c*)

CHAPTER 13

1. (*b*) **2.** (*c*) **3.** (*a*) **4.** (*d*) **5.** (*b*) **6.** (*b*)
7. (*a*) **8.** (*d*) **9.** (*b*) **10.** (*c*) **11.** (*b*) **12.** (*c*)
13. (*a*) **14.** (*a*) **15.** (*a*)

CHAPTER 14

1. (*c*) **2.** (*a*) **3.** (*a*) **4.** (*b*) **5.** (*c*) **6.** (*b*)
7. (*a*) **8.** (*b*) **9.** (*d*) **10.** (*b*) **11.** (*d*) **12.** (*d*)
13. (*b*) **14.** (*a*) **15.** (*b*) **16.** (*b*) **17.** (*c*) **18.** (*a*)
19. (*c*) **20.** (*d*) **21.** (*a*) **22.** (*b*) **23.** (*c*) **24.** (*a*)
25. (*c*) **26.** (*b*) **27.** (*b*) **28.** (*d*) **29.** (*c*) **30.** (*a*)
31. (*b*) **32.** (*c*) **33.** (*a*) **34.** (*d*) **35.** (*c*) **36.** (*b*)
37. (*d*) **38.** (*a*) **39.** (*b*) **40.** (*c*) **41.** (*b*) **42.** (*b*)

43. (*a*) **44.** (*c*) **45.** (*d*) **46.** (*b*) **47.** (*a*) **48.** (*b*)
49. (*d*) **50.** (*b*) **51.** (*a*) **52.** (*a*) **53.** (*d*) **54.** (*c*)
55. (*c*) **56.** (*a*) **57.** (*b*)

CHAPTER 15

1. (*a*) **2.** (*b*) **3.** (*d*) **4.** (*a*) **5.** (*b*) **6.** (*c*)
7. (*d*) **8.** (*d*) **9.** (*a*) **10.** (*b*) **11.** (*b*) **12.** (*a*)
13. (*d*) **14.** (*b*) **15.** (*d*) **16.** (*b*) **17.** (*b*) **18.** (*c*)
19. (*a*) **20.** (*c*) **21.** (*d*) **22.** (*a*) **23.** (*b*) **24.** (*d*)
25. (*c*) **26.** (*d*) **27.** (*d*) **28.** (*a*) **29.** (*d*) **30.** (*b*)
31. (*d*) **32.** (*a*) **33.** (*a*) **34.** (*c*) **35.** (*a*) **36.** (*c*)
37. (*c*) **38.** (*a*) **39.** (*b*) **40.** (*c*) **41.** (*b*) **42.** (*d*)
43. (*d*) **44.** (*c*) **45.** (*d*) **46.** (*a*) **47.** (*b*) **48.** (*d*)
49. (*c*) **50.** (*d*) **51.** (*a*) **52.** (*c*) **53.** (*d*) **54.** (*c*)
55. (*b*) **56.** (*c*) **57.** (*a*) **58.** (*a*) **59.** (*d*) **60.** (*c*)

CHAPTER 16

1. (*d*) **2.** (*a*) **3.** (*c*) **4.** (*b*) **5.** (*c*) **6.** (*d*)
7. (*a*) **8.** (*b*) **9.** (*c*) **10.** (*b*) **11.** (*c*) **12.** (*a*)
13. (*d*) **14.** (*b*) **15.** (*b*) **16.** (*a*) **17.** (*c*) **18.** (*b*)
19. (*c*) **20.** (*d*) **21.** (*a*) **22.** (*d*) **23.** (*d*) **24.** (*b*)
25. (*c*) **26.** (*b*) **27.** (*a*) **28.** (*c*) **29.** (*b*) **30.** (*a*)
31. (*d*) **32.** (*b*) **33.** (*c*) **34.** (*c*) **35.** (*c*) **36.** (*b*)
37. (*c*) **38.** (*d*) **39.** (*b*) **40.** (*b*)

CHAPTER 17

1. (*a*) **2.** (*b*) **3.** (*a*) **4.** (*a*) **5.** (*d*) **6.** (*b*)
7. (*c*) **8.** (*c*) **9.** (*b*) **10.** (*a*) **11.** (*b*) **12.** (*d*)
13. (*a*) **14.** (*b*) **15.** (*c*) **16.** (*a*) **17.** (*c*) **18.** (*c*)
19. (*c*) **20.** (*b*) **21.** (*b*) **22.** (*c*) **23.** (*a*) **24.** (*b*)
25. (*c*) **26.** (*b*) **27.** (*c*) **28.** (*c*) **29.** (*b*) **30.** (*b*)
31. (*c*) **32.** (*a*) **33.** (*a*) **34.** (*c*) **35.** (*b*)