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HOTS Questions on Ch 1 & 2 (Class IX)

1. If $x^{1/p} = Y^{1/q} = z^{1/r}$ and xyz=1, then the value of p + q + r is

   (a) 1 (b) 0 (c) ½ (d) none of these

2. $[\{(2)^{1/2} . (4)^{3/4} . (8)^{5/6} . (16)^{7/8} .(32)^{9/10}\}^4]^{3/25}$ is

   (a) A fraction (b) an integer (c)1 (d) none of these

3. $[1-\{1-(1-x^2)^{-1}\}^{-1}]^{-1/2}$ is equal to

   (a) x (b)1/x (c)1 (d) none of these

5. If $x = P^{1/3} - P^{-1/3}$ then

   (a) $x^3+3x = p+1/p$ (b) $x^3+3x = p-1/p$ (c) $x^3+3x = p+1$ (d) none of these

6. If $x = 3^{1/3} + 3^{-1/3}$, then $3x^3 - 9x$ is

   (a) 15 (b)10 (c)12 (d) none of these

7. If $a^x = b$, $b^y=c$, $c^z = a$, then xyz is

   (a) 1 (b)2 (c)3 (d) none of these

8. The value of $\frac{x^{2/7}}{z^{-1/2}} \times \frac{x^{2/5}}{z^{1/3}} \times \frac{x^{-9/7}}{z^{2/3}} \times \frac{\sqrt{z}}{x^{-3/5}}$ is

   (a) 1 (b)-1 (c) 0 (d) none

9. On simplification $\frac{2^{x+3} \times 3^{2x-y} \times 5^{x+y+3} \times 6^{y+1}}{6^{x+1} \times 10^{y+3} \times 15^x}$ reduces to

   (a) -1 (b) 0 (c)1 (d) none of these

10. If $\frac{9^y . 3^{2x} . (3^{-y})^{-1} . 27^y}{3^{3x} . 3^{5x}} = \frac{1}{27}$ then x-y is given by

    (a) -1 (b) 1/2 (c) 0 (d) none of these

11. $\frac{16(32)^x - 2^{3x-2} . 4^{x+1}}{15(2)^{x-1}(16)^x} - \frac{5(5)^{x-1}}{\sqrt{5^{2x}}}$ is given by

    (a) 1 (b)-1 (c) 4 (d) 0

12. $x^{a^2b^{-1}c^{-1}} . x^{b^2c^{-1}a^{-1}} . x^{c^2 a^{-1} b^{-1}} - x^3$ would reduce to zero if a+b+c is given by

(a) 1 (b)-1 (c)0 (d) none

13. $\frac{1}{x^{b-a}+x^{c-a}+1} + \frac{1}{x^{c-b}+x^{a-b}+1} + \frac{1}{x^{a-c}+x^{b-c}+1}$ would reduce to

(a) 1 (b) 0 (c)-1 (d) none

14 If $2^{2x+3}-3^2.2^x+1=0$ then values of x are

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

15. Solving $9^x = 3^y$ and $5^{x+y+1} = 25^{xy}$ we get the following roots

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

16. Solving $x^3 - 6x^2 + 11x - 6 = 0$ we get the following roots

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

17. If $4x^3 + 8x^2 - x - 2 = 0$ then values of (2x+3) are given by

(a) 4, -1, 2 (b)-4, 2, 1 (c)2, -4, -1 (d) none of these

18. The rational root of the equation $2x^3 - x^2 - 4x + 2 = 0$ is

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

19. $If\ x = \frac{1}{2-\sqrt{3}}\ find\ the\ value\ of\ x^3 - 2x^2 - 7x + 5$

20. Find the value of $\frac{1}{\sqrt{1}+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{4}} + \cdots \frac{1}{\sqrt{99}+\sqrt{100}}$

21. $If\ x = 2 + \sqrt{3}\ \ then\ find\ the\ value\ of\ \frac{1}{x}, x + \frac{1}{x}, x - \frac{1}{x}, x^2 - \frac{1}{x^2},$
$x^2 + \frac{1}{x^2},\ x^3 + \frac{1}{x^3},\ x^3 - \frac{1}{x^3}, x^4 - \frac{1}{x^4},\ x^4 + \frac{1}{x^4}$

22. $If\ x = \frac{\sqrt{3}+1}{2}\ find\ the\ value\ of\ 4x^3 + 2x^2 - 8x + 7$

23. If $x = 1-\sqrt{2}$, find the value of $(x - \frac{1}{x})^2$

24. $Simplfy: \sqrt{4 + 2\sqrt{3}}$

25. $If x^2 + y^2 + z^2 - xy - yz - zx = 0\ then\ prove\ that\ x = y = z$

26. $x^3 + ax^2 + bx + 6$ is divisible by$(x - 2)$, but leaves a remainder 3 when divided by $(x - 3)$. Find the values of a & b.

27 Prove that $\frac{(x-y)^3+(y-z)^3+(z-x)^3}{(x^2-y^2)^3+(y^2-z^2)^3+(z^2-x^2)^3} = \frac{1}{(x+y)(y+z)(z+x)}$

28. If $x^2 + \frac{1}{x^2} = 98$, then find the value of $x^3 + \frac{1}{x^3}$.

29 Factorise :- $(2a - b)^3 + (b - 2c)^3 + 8(c - a)^3$

30. If $x^4 + \frac{1}{X4} = 119$ then find the value of $x^3 - \frac{1}{x^3}$.

Chapter 3 and 4
Coordinate Geometry and Linear Equations

Section – I

1. If the coordinates of the two points are P(-2,3) & Q(-3,5), then (abscissa of P) – (abscissa of Q)
2. Draw a trapezium ABCD in which vertices A,B,C,D are (4,6) , (-2,3) , (-2,-3) and (4, -7) respectively.
3. Draw a parallelogram PQRS whose vertices P,Q,R,S are (-3,2) , (-5,-4) , (-2,-4) and (0,2) respectively.
4. Draw a square A,B,C,D whose vertices are (1,2) , (-7,2) , (-7,-6) and (1,-6) respectively.
5. Draw a triangle ABC whose vertices are A(7,10), B(-5,13), C(13,-5) . Measure The length of sides AB, BC and AC. Also verify that AB+AC < BC.
6. Find the coordinates of the vertices of the square ABCD (sides = 2a) by taking the centre of the square as origin and axes parallel to the side AB, AD.
7. By taking suitable units of distances on both the axes, plot the points A(3,2), B(3,-3), C(6,-3) in a XY plane. Name the figure obtained in joining the plotted points. And if possible, find the area of the figure.
8. A city has two main roads meeting at the center of the city. These two roads are along the North-South directions and East-West direction. All other streets of the city run parallel to main roads and are 200m apart. There are about 5 streets in each direction using 1cm = 200m, draw the model of the city.
9. In the figure ABCD is a square with coordinates B & D are B(2,3) and D(-1,-2). Find the coordinates of A & C.
10. In figure, triangle ABC is an equilateral triangle with coordinates of B and C as B(1,0) & C(5,0). Find the coordinates of vector A.
11. Three straight lines x = 2 , x – y = 0, x + y = 0 intersect each other in the Cartesian plane to form ΔABC . Find the equation of the median/medians and the area of the triangle.
12. Represent the equations $x - y = 1, x + y = 1, x + y = -1, x - y = -1$ on the Cartesian planes and identify the figure formed therein .
13. Ayush was positioned at (-2,3) on a Cartesian plane in the beginning of a game. He moved 4 units towards west, then 6 units north and then again 6 units towards east. Identify the final position.
14. Taxi fare in a city is Rs. 9 for the first kilometer and for the subsequent distance it is Rs. 7 per Km. Write an equation to express this information in two variables taking distance covered as x and the total fare as y. Find the distance travelled by a person if he spent Rs.72.
15. Plot the points A(0,6), B(-3,1), C(0,-4) and D(3,1) on Cartesian plane. Name the figure obtained by joining the four points. Find the length of the diagonals AC and BD .

Section - II

16. Any point on y- axis is of the form :
    a) (x,y) where $x \neq 0, y \neq 0$
    b) (0,y) where $y \neq 0$
    c) (x,0) where $x \neq 0$
    d) (x,x) where $x \neq 0$.

17. x=1. y=2 is the solution of linear equation :
    a) $x + 3y = 9$
    b) 3x+5y=15
    c) $3x - 2y = 1$
    d) $x + y = 3$.

18. The graph of the line x= - 5 passes through the point
    a) (0, -5)
    b) (3,-5)
    c) (0, 0)
    d) (-5, 3).

19. The graph of equation x = 4 does not pass through the point :
    a) (4,0)
    b) (4,2)
    c) (0,4)
    d) (4,4).

20. y=0 is the equation of :
    a) x- axis
    b) y- axis
    c) both x- axis and y- axis
    d) a line parallel to y- axis

21. Two solutions of the linear equation $2x - 3y = -11$ are :
    a) (-1,3) &(4,1)
    b) (-1,3) &(2,-5)
    c) (2,5) & (1,3)
    d) (2,5) & (-1,3)

22. The straight line passing through the points (-3,3) , (0,0), and (3,-3) has equation :
    a) $x - y = 0$
    b) $x = 2y$
    c) $x + y = 0$
    d) $y = x$

23. For the linear equation $x = -2y$, the value of a, b, c is :
    a) 1,2,0 b) 1,-2,1 c) 0,1 , 2 d) 0,-1,-2

24. The graph of the linear equation $2x + 3y = 6$ is a line which meets the x- axis at the point :
    a) (0,2) b) (2,0) c) (3,0) d) (0,3)

25. If the line represented by the solution $3x + \alpha y = 8$ passes through the point (2,2), then the value of α is :
    a) 4 b) 1 c) 3 d) 0

26. The equation 2x+5y= 12 has unique solution if x, y are :
    a) Natural numbers b) Positive real numbers c) Irrational numbers d) Rational numbers

27. Y = 9X + 7 has :
    a) Unique solution b) Two solutions c) No solution d) Infinitely many solutions

28. The area of the ΔOAB formed by the line $2x + 3y = 6$ with the axis is :
    a) 6 sq. units b) 3 sq. units c) 2 sq. units d) 12 sq. units

29. The intercept made by $3x - 2y = -12$ on y axis is :
    a) -4 b) -6 c) 6 d) Can't be determined.

30. If a line passes through (1,1), (-1,-1) and (3,3) then the line :
    a) Passes though (- 1, 3) b) Passes though origin c) Passes though (0,1) d) Given information is insufficient.