

**CLASS -IX
MATHEMATICS**

1. Simplify the following by rationalizing the denominator:

a) $\frac{7\sqrt{3} - 5\sqrt{2}}{\sqrt{48} + \sqrt{18}}$

b) $\frac{1}{5-2\sqrt{3}} + \frac{1}{5+2\sqrt{3}}$

2. Find a & b for:

(1) $\frac{\sqrt{3}-1}{\sqrt{3}+1} = a + b\sqrt{3}$

(2) $\frac{\sqrt{2}+1}{\sqrt{2}-1} = a + b\sqrt{2}$

(3) $\frac{\sqrt{5}-1}{\sqrt{5}+1} = a + b\sqrt{5}$

3. Find the value of $\frac{1}{\sqrt{1}+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{4}} + \dots + \frac{1}{\sqrt{99}+\sqrt{100}}$ 4. If $x = 2 + \sqrt{3}$ then find the value of $\frac{1}{x}, x + \frac{1}{x}, x - \frac{1}{x}, x^2 - \frac{1}{x^2}, x^2 + \frac{1}{x^2}, x^4 - \frac{1}{x^4}, x^4 + \frac{1}{x^4}$ 5. If $x = \frac{1}{2-\sqrt{3}}$ find the value of $x^3 - 2x^2 - 7x + 5$ 6. If $x = \frac{\sqrt{3}+1}{2}$ find the value of $4x^3 + 2x^2 - 8x + 7$ 7. If $x = 1 - \sqrt{2}$, find the value of $(x - \frac{1}{x})^2$ 8. Simplify: $\sqrt{4 + 2\sqrt{3}}$ 9. Express the following in the form of $\frac{p}{q}$, where p and q are integers and $q \neq 0$

$2.\bar{3}, \quad 3.\overline{45}, \quad 4.\overline{567}, \quad 2.3\bar{4}, \quad 3.45\bar{6}, \quad 5.6\bar{78}$

10. Find 3 rational numbers between $\frac{2}{3}$ and $\frac{3}{4}$.11. Find 3 irrational numbers between $\frac{2}{3}$ and $\frac{3}{4}$.12. Represent on number line $\sqrt{2}, \sqrt{3}, \sqrt{5}, \sqrt{13}, \sqrt{4.8}, \sqrt{9.3}$ 13.. Find the value of : a) $\sqrt[4]{\sqrt[3]{2^2}}$ b) $\sqrt[3]{(343)^{-2}}$ 14.. If $\sqrt{10} = 3.162$, then find the value of $\frac{1}{\sqrt{10}}$ 15. Simplify: (i) $8^{\frac{2}{3}}$ (ii) $81^{-\frac{3}{4}}$ (iii) $125^{-\frac{2}{3}}$

16. Plot the following points and write the name of the figure obtained by

- joining them in order: P(-3, 2), Q(-7, -3), R(6, -3), S(2, 2)
17. Points A(5, 3), B(-2, 3) and D(5, -4) are three vertices of a square ABCD. Plot these points on a graph paper and hence find the coordinates of the vertex C.
 18. Write the coordinates of the vertices of a rectangle whose length and breadth are 5 and 3 units respectively, one vertex at the origin, the longer side lies on the x -axis and one of the vertices lies in the third quadrant.
 19. Plot the points P(1, 0), Q(4, 0) and S(1, 3). Find the coordinates of the point R such that PQRS is a square.
 20. Determine the point on the graph of the linear equation $2x + 5y = 12$, whose ordinate is 2 times its abscissa.
 21. Draw the graph of the equation represented by a straight line which is parallel to the x -axis and at a distance 3 units below it.
 22. Draw the graph of the linear equation whose solutions are represented by the points having the sum of the coordinates as 10 units.
 23. Write the linear equation such that each point on its graph has an ordinate 3 times its abscissa.
 24. If the point (3, 4) lies on the graph of $3y = ax + 7$, then find the value of a .
 25. Find the solution of the linear equation $x + 2y = 8$ which represents a point on (i) x -axis (ii) y -axis
 26. For what value of c , the linear equation $2x + cy = 8$ has equal values of x and y for its solution.
 27. Let y varies directly as x . If $y = 12$ when $x = 4$, then write a linear equation. What is the value of y when $x = 5$?
 28. Draw the graph of the linear equation $3x + 4y = 6$. At what points, the graph cuts the x -axis and the y -axis.
 29. Using the relation between Celsius and Fahrenheit scales draw a linear graph then answer the following :-
 - (i) If the temperature is 86°F , what is the temperature in Celsius?
 - (ii) If the temperature is 35°C , what is the temperature in Fahrenheit?
 - (iii) If the temperature is 0°C what is the temperature in Fahrenheit and if the temperature is 0°F , what is the temperature in Celsius?
 - (iv) What is the numerical value of the temperature which is same in both the scales?
 30. The force exerted to pull a cart is directly proportional to the acceleration produced in the body. Express the statement as a linear equation of two variables and draw the graph of the same by taking the constant mass equal to 6 kg. Read from the graph, the force required when the acceleration produced is (i) 5 m/sec^2 , (ii) 6 m/sec^2 .

Find the correct solutions of the following multiple choice questions(based on indices and the number system.)

31. 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) $\frac{1}{2}$ (d) none of these
32. $[\{(2)^{1/2} \cdot (4)^{3/4} \cdot (8)^{5/6} \cdot (16)^{7/8} \cdot (32)^{9/10}\}^4]^{3/25}$ is
- (a) A fraction (b) an integer (c) 1 (d) none of these
33. $[1-\{1-(1-x^2)^{-1}\}^{-1}]^{-1/2}$ is equal to
- (a) x (b) $1/x$ (c) 1 (d) none of these
34. If $a^x = b$, $b^y = c$, $c^z = a$, then xyz is
- (a) 1 (b) 2 (c) 3 (d) none of these
35. $x^{a^2b^{-1}c^{-1}} \cdot x^{b^{2c^{-1}a^{-1}}} \cdot x^{c^{2a^{-1}b^{-1}}} - x^3$ would reduce to zero if $a+b+c$ is given by (a) 1 (b) -1 (c) 0 (d) none
36. If $2^{2x+3} - 3^2 \cdot 2^x + 1 = 0$ then values of x are
- (a) 0, 1 (b) 1, 2 (c) 0, 3 (d) none of these
37. 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) none of these
38. Every rational number is
- (A) a natural number
 (B) an integer
 (C) a real number
 (D) a whole number
39. Between two rational numbers
- (A) there is no rational number
 (B) there is exactly one rational number
 (C) there are infinitely many rational numbers
 (D) there are only rational numbers and no irrational numbers
40. Decimal representation of a rational number cannot be
- (A) terminating
 (B) non-terminating
 (C) non-terminating repeating
 (D) non-terminating non-repeating