CLASS - IX

(Mathematics)

Find the values of a and b —

Q. 1. $\frac{3+\sqrt{2}}{3-\sqrt{2}} = a + b\sqrt{2}$

Q. 2. $\frac{7+\sqrt{5}}{7-\sqrt{5}} - \frac{7-\sqrt{5}}{7+\sqrt{5}} = a + \frac{7}{11}\sqrt{5}\,b.$

Q. 3. If $x = 1-\sqrt{2}$, find the value of $\left(x - \frac{1}{x}\right)^3$

Q. 4. If $x = 2+\sqrt{3}$,
find the values of (i) $x - \frac{1}{x}$ (ii) $x^2 + \frac{1}{x^2}$

Q. 5. If $x = 3-2\sqrt{2}$, find $x^2 + \frac{1}{x^2}$

Q. 6. If $x^2 + \frac{1}{x^2} = 27$, find the values of each of the following:

(i) $x + \frac{1}{x}$ (ii) $x - \frac{1}{x}$.

Q. 7. If $4x^2 + y^2 = 40$ and $xy = 6$, find the values of $2x + y$.

Q. 8. If $3x - 7y = 10$ and $xy = 2$, find the value of $4x^2 + 9y^2$

Q. 9. If $x = 3+2\sqrt{2}$. find the value of $\sqrt{x} - \frac{1}{\sqrt{x}}$

Q. 10. If $a = 5+2\sqrt{6}$ and $b = \frac{1}{a}$, find the values of

(i) $a^2 + b^2$ (ii) $a + b$ (iii) $a^2 - b^2$

Q.11. Using proper Identity factorise the following:

(i) $8x^3+y^3+27z^3-18xyz$

(ii) $a^3-b^3+1+3ab$

(iii) $2\sqrt{2}a^3+8b^3-27c^3+18\sqrt{2}abc$.

Q.12. Factorise:

(i) $64m^3-343n^3$ (ii) $a^7+ab^6$.

Q.13. Simplify: $\left(\frac{x}{3}+\frac{y}{5}\right)^3-\left(\frac{x}{3}-\frac{y}{5}\right)^3$

Q.14. By using proper identity, factorise the following

(i) $8a^3+b^3+12a^2b+6ab^2$ (ii) $27p^3-\frac{1}{216}-\frac{9}{2}p^2+\frac{1}{4}p$.

Q.15. Factorise:

(i) $84-2r-2r^2$ (ii) $12x^2-7x+1$.

Q.16. Factorise:

(i) $x^2+5x+6$ (ii) $x^2+5x-6$.

(iii) $x^2-5x+6$ (iv) $x^2-5x-6$.

Q.17. Factorise:

(i) $7\sqrt{2}x^2-10x-4\sqrt{2}$ (ii) $x^2-(1+\sqrt{2})x+\sqrt{2}$

(iii) $\sqrt{2}x^2+7x+5\sqrt{2}$

Q.18. Simplify: $\dfrac{(a^2-b^2)^3+(b^2-c^2)^3+(c^2-a^2)^3}{(a-b)^3+(b-c)^3+(c-a)^3}$

Q 19. If $a+b=3$ and $ab=2$, find the values of :

(i) $a^2+b^2$ (ii) $a-b$ (iii) $a^2-b^2$.

Q.20. If $a-b=7$ and $a^2+b^2=85$, then find the value of $a^3-b^3$.

Q.21. solve by substitution method :

$2(x-3)+3(y-5)=0$

$5(x-1)+4(y-4)=0$

Q22. Solve by substitution method :

$$\frac{2x+1}{7}+\frac{5y-3}{3}=12$$

$$\frac{3x+2}{2}-\frac{4y+3}{9}=13.$$

Q23. solve for $x$ and $y$ : (use method of elimination by equating co-efficients)

(i) $\frac{y+7}{5}=\frac{2y-x}{4}+3x-5$

$\frac{7-5x}{2}+\frac{3-4y}{6}=5y-18.$

(ii) $13x+11y=70$

$11x+13y=74.$

Q24. Solve the following equation using cross multiplication method

(i) $\frac{a}{x}-\frac{b}{y}=0$

$\frac{ab^2}{x}+\frac{a^2b}{y}=a^2+b^2$

(ii) $\frac{2xy}{x+y}=\frac{3}{2}$

$\frac{xy}{2x-y}=-\frac{3}{10}$ ; $x+y\neq 0$ and $2x-y\neq 0$