Class – IX **Maths Assignment**

Number system

- 1. Find the rationalizing factor of $\sqrt{300}$
- 2. Express $0.1\overline{23}$ in the form of $\frac{p}{a}$.

3. If
$$\sqrt{5}$$
 = 2.236 and $\sqrt{3}$ = 1.732. Find the value of $\frac{2}{\sqrt{5}+\sqrt{3}} + \frac{2}{\sqrt{5}-\sqrt{3}}$

4. Find two rational and two irrational numbers between $\frac{1}{2}$ and $\frac{1}{2}$.

5. Prove that
$$\frac{1}{1+x^{b-a}+x^{c-a}} + \frac{1}{1+x^{a-b}+x^{c-b}} + \frac{1}{1+x^{a-c}+x^{b-c}} = 1$$

- 6. Simplify by rationalizing the denominator $\frac{7+3\sqrt{5}}{7-3\sqrt{5}}$
- 7. Find three rational and three irrational numbers between 2.2 and 2. $\overline{2}$.

8. Find a and b if
$$\frac{3-\sqrt{6}}{3+2\sqrt{6}} = a\sqrt{6} - b$$
.

9. If
$$= 2 + \sqrt{3}$$
. Find $x^2 + \frac{1}{x^2}$.

10. If
$$\frac{\sqrt{2}+\sqrt{3}}{3\sqrt{2}-2\sqrt{3}} = a + \sqrt{b}$$
. Find the value of a and b.

11. If
$$x = \frac{\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}}$$
 and $y = \frac{\sqrt{3} - \sqrt{2}}{\sqrt{3} + \sqrt{2}}$. Find $x^2 + y^2$.
12. Simplify $\left(\frac{x^b}{x^c}\right)^{b+c-a} \times \left(\frac{x^c}{x^a}\right)^{c+a-b} \times \left(\frac{x^a}{x^b}\right)^{a+b-c}$.
13. Prove that $\frac{1}{\sqrt{4} + \sqrt{5}} + \frac{1}{\sqrt{5} + \sqrt{6}} + \frac{1}{\sqrt{6} + \sqrt{7}} + \frac{1}{\sqrt{7} + \sqrt{8}} + \frac{1}{\sqrt{8} + \sqrt{9}} = 1$

Polynomials

- Q1. If (-1) is a zero of the polynomial $p(x) = ax^3 x^2 + x + 4$, find the value of a.
- Q2. For what value of m, is the polynomial $x^3 2mx^2 + 16$ divisible by (x + 2)?
- Q3. If the polynomials $px^3 + 4x^2 + 3x 4$ and $x^3 4x + p$ are divided by x 3, then the remainder in each case is the same. Find the value of p.
- Q4. If the polynomials $p(x) = 2x^3 + bx^2 + 3x 5$ and $q(x) = x^3 + x^2 4x b$ leave the same remainder when divided by x - 2, find b.
- Q5. Divide $3x^3 8x^2 + 3x + 2$ by $x^2 3x + 2$ and verify the division algorithm.
- Q6. The polynomials $ax^3 3x^2 + 4$ and $2x^3 5x + a$, when divided by (x-2), leave the remainders p and q respectively. If p - 2q = 4, find the value of a.
- Q7. If x + y + 2 = 0, then write the value of $x^3 + y^3 + 8$
- Q8. If 2x + 3y = 8 and xy = 4, then find the value of $4x^2 + 9y^2$.
- Q9. If $x^2 + \frac{1}{x^2} = 38$, then find the value of $\left(x \frac{1}{x}\right)$.
- Q10. If 2x + y = -5, prove that $8x^3 + y^3 30xy + 125 = 0$.
- O11. If a + b + c = 6 and $a^2 + b^2 + c^2 = 20$, find ab + bc + ca.

Q12. If
$$\left(x + \frac{1}{x}\right) = 7$$
, then find the value of $\left(x^3 + \frac{1}{x^3}\right)$

Q12. If $(x + \frac{1}{x}) = 1$, then find the value of $(x^3 + \frac{1}{x^3})$. Q13. If a, b, c are all non zero and a + b + c = 0, prove that $\frac{a^2}{bc} + \frac{b^2}{ca} + \frac{c^2}{ab} = 3$ Q14. Prove that $\frac{0.75 \times 0.75 \times 0.75 + 0.25 \times 0.25 \times 0.25}{0.75 \times 0.75 - 0.75 \times 0.25 + 0.25 \times 0.25} = 1$ Q15. If x + y + z = 1, xy + yz + zx = -1, and xyz = -1, find the value of $x^3 + y^3 + z^3$. Q16. If $f(x) = x^4 - 2x^3 + 2x^2 - 2x^4 + b = 1$.

Q16. If $f(x) = x^4 - 2x^3 + 3x^2 - ax + b$ is divided by (x - 1) and (x + 1), it leaves the remainders 5 & 19 respectively. Find a and b.

Q17. If $x^3 + ax^2 + bx + 6$ has x – 2 as a factor and leaves a remainder 3, when divided by x – 3, find the values of a and b.

Q18. Without actual division, prove that $x^4 + 2x^3 - 2x^2 + 2x - 3$ is exactly divisible by $x^2 + 2x - 3$. Q19. If $\left(x + \frac{1}{x}\right) = 6$, find the value of $\left(x^4 + \frac{1}{x^4}\right)$. Q20. If $(x + \frac{1}{x}) = 3$, find the value of $(x^2 + \frac{1}{x^2})$.

Q21. If both (x - 2) and $x - \frac{1}{2}$ are factors of $px^2 + 5x + r$, show that p = r.

Q22. Find the remainder, if $x^{49} + 61$ is divided by x + 1.

- Q23. Write the coefficient of x^2 in the expansion of $(x 2)^3$.
- Q24. If $x^2 1$ is a factor of $ax^3 + bx^2 + cx + d$ show that a + c = 0.
- Q25. What must be subtracted from $4x^4 2x^3 6x^2 + x 5$ so that the result is exactly divisible by $4x^2 + 2x$.
- Q26. Show that (x 1) is a factor of $x^{10} 1$.
- Q27. Evaluate the following using a suitable identity:

a) 998^3 b) 10.2^3 c) 9.8^3 d) $998^2 - 4$ e) $(-25)^3 + 10^3 + 15^3$ g) 10.2×9.8 Q28. If x = 2 and x = 0 are zeroes of the polynomial $2x^3 - 5x^2 + p x + b$, then find the value of p and b. Factorize the following

1.
$$12x^2 - x - 6$$

2. $12(y^2 + 7y)^2 - 8(y^2 + 7y)(2y - 1) - 15(2y - 1)^2$
3. $x^2 + y - xy - x$
4. $1 - a^2 - b^2 - 2ab$
5. $(25x^2 - 1) + (1 + 5x)^2$
6. $2x^3 - 3x^2 - 17x + 30$
7. $9x^2 + 4y^2 + 16z^2 + 12xy - 16yz - 24xz$
8. $x^2 - 32x - 105$
9. $(x^2 - 2x)^2 - 11(x^2 - 2x) + 24$
10. $(x - y)^3 + (y - z)^3 + (z - x)^3$
11. $x^2 + \frac{1}{x^2} + 2 - 2x - \frac{2}{x}$
12. $(a^2 - 2a)^2 - 23(a^2 - 2a) + 120$
13. $x - 8xy^3$
14. $(x + 1)^2 - (y - 1)^2$
15. $(x^2 - 4x)(x^2 - 4x - 1) - 20$
16. $a^3 - b^3 + 1 + 3ab$
17. $(a + b + c)^2 - (a - b - c)^2$
18. $(5x - 7y)^3 + (9z - 5x)^3 + (7y - 9z)^3$
19. $5\sqrt{5x^2} + 30x + 8\sqrt{5}$
20. $2x^2 - \frac{5}{6}x + \frac{1}{12}$
21. $x^2 - 4x - 32$
22. $5x^2 + 16x + 3$
23. $x^3 + 9x^2 + 23x + 15$
24. $x^3 + 6x^2 + 11x + 6$
25. $4x^2 - 9y^2 + 20x + 25$
26. $x^3 + \frac{1}{x^3} - 2$
27. $7\sqrt{2x^2} - 10x - 4\sqrt{2}$
28. $\frac{1}{64}a^3 + b^3 + 125c^3 - \frac{15}{4}abc$
29. $x^4 + y^4 + x^2y^2$
30. $a^6 - b^6$