# Class - IX <br> Maths Assignment 

## Number system

1. Find the rationalizing factor of $\sqrt{300}$
2. Express $0.1 \overline{23}$ in the form of $\frac{p}{q}$.
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 $\frac{1}{3}$ 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 $\mathrm{p}(\mathrm{x})=a x^{3}-x^{2}+x+4$, find the value of a.
Q2. For what value of $m$, is the polynomial $x^{3}-2 m x^{2}+16$ divisible by $(\mathrm{x}+2)$ ?
Q3. If the polynomials $p x^{3}+4 x^{2}+3 x-4$ and $x^{3}-4 x+p$ are divided by $x-3$, then the remainder in each case is the same. Find the value of p .
Q4. If the polynomials $p(x)=2 x^{3}+b x^{2}+3 x-5$ and $q(x)=x^{3}+x^{2}-4 x-b$ leave the same remainder when divided by $x-2$, find $b$.
Q5. Divide $3 x^{3}-8 x^{2}+3 x+2$ by $x^{2}-3 x+2$ and verify the division algorithm.
Q6. The polynomials $a x^{3}-3 x^{2}+4$ and $2 x^{3}-5 x+a$, when divided by ( $\mathrm{x}-2$ ), leave the remainders p and q respectively. If $\mathrm{p}-2 \mathrm{q}=4$, find the value of a .
Q7. If $x+y+2=0$, then write the value of $x^{3}+y^{3}+8$
Q8. If $2 x+3 y=8$ and $x y=4$, then find the value of $4 x^{2}+9 y^{2}$.
Q9. If $x^{2}+\frac{1}{x^{2}}=38$, then find the value of $\left(x-\frac{1}{x}\right)$.
Q10. If $2 \mathrm{x}+\mathrm{y}=-5$, prove that $8 x^{3}+y^{3}-30 x y+125=0$.
Q11. If $\mathrm{a}+\mathrm{b}+\mathrm{c}=6$ and $a^{2}+b^{2}+c^{2}=20$, find $\mathrm{ab}+\mathrm{bc}+\mathrm{ca}$.
Q12. If $\left(x+\frac{1}{x}\right)=7$, then find the value of $\left(x^{3}+\frac{1}{x^{3}}\right)$.
Q13. If $\mathrm{a}, \mathrm{b}, \mathrm{c}$ are all non zero and $\mathrm{a}+\mathrm{b}+\mathrm{c}=0$, prove that $\frac{a^{2}}{b c}+\frac{b^{2}}{c a}+\frac{c^{2}}{a b}=3$
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 $x+y+z=1$, $x y+y z+z x=-1$, and $x y z=-1$, find the value of $x^{3}+y^{3}+z^{3}$.
Q16. If $f(x)=x^{4}-2 x^{3}+3 x^{2}-a x+b$ is divided by $(x-1)$ and $(x+1)$, it leaves the remainders $5 \&$ 19 respectively. Find a and b.
Q17. If $x^{3}+a x^{2}+b x+6$ 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 $x^{4}+2 x^{3}-2 x^{2}+2 x-3$ is exactly divisible by $x^{2}+2 x-3$.
Q19. If $\left(x+\frac{1}{x}\right)=6$, find the value of $\left(x^{4}+\frac{1}{x^{4}}\right)$.
Q20. If $\left(x+\frac{1}{x}\right)=3$, find the value of $\left(x^{2}+\frac{1}{x^{2}}\right)$.
Q21. If both $(\mathrm{x}-2)$ and $x-\frac{1}{2}$ are factors of $p x^{2}+5 x+r$, show that $\mathrm{p}=\mathrm{r}$.
Q 22 . Find the remainder, if $x^{49}+61$ is divided by $\mathrm{x}+1$.

Q23. Write the coefficient of $x^{2}$ in the expansion of $(x-2)^{3}$.
Q24. If $x^{2}-1$ is a factor of $a x^{3}+b x^{2}+c x+d$ show that $\mathrm{a}+\mathrm{c}=0$.
Q25. What must be subtracted from $4 x^{4}-2 x^{3}-6 x^{2}+x-5$ so that the result is exactly divisible by $4 x^{2}+2 x$.
Q26. Show that $(\mathrm{x}-1)$ 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) $10.2 \times 9.8$

Q28. If $x=2$ and $x=0$ are zeroes of the polynomial $2 x^{3}-5 x^{2}+p x+b$, then find the value of $p$ and $b$.

## Factorize the following

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