MATHEMATICS

CLASS IX

CHAPTER 7: POLYNOMIAL

1. Both $(x-2)$ and $\left(x-\frac{1}{2}\right)$ are the factors of the polynomial px^2+5x+r, calculate and write the relation between p and r.

Ans. Let, $f(x)=Px^2+5x+r$

Zero of the polynomial $(x-2)$ is 2 $\quad\because\ x-2=0$ or, $x=2$

Zero of the polynomial $\left(x-\frac{1}{2}\right)$ is $\frac{1}{2}$, $\quad\because\ x-\frac{1}{2}=0$ or, $x=\frac{1}{2}$

$\because$ $(x-2)$ and $\left(x-\frac{1}{2}\right)$ are the factors of $f(x)$

$\therefore\quad p(2)^2+5(2)+r=0$ or, $4p+r=-10$

again, $\quad p\left(\frac{1}{2}\right)^2+5\left(\frac{1}{2}\right)+r=0$

or, $\frac{p}{4}+\frac{5}{2}+r=0$ or, $p+4r=-10$

$\therefore\quad 4p+r=p+4r$ or, $3p=3r$ or, $p=r$

2. Find the values of a and b if x^2-4 is a factor of the polynomial $ax^4+2x^3-3x^2+bx-4$.

Ans. Let, $f(x)=ax^4+2x^3-3x^2+bx-4$

$\because$ (x^2-4) is a factor of $f(x)$

$\therefore$ $(x-2)$ and $(x+2)$ both are factors of $f(x)$

$\therefore$ $f(2)=0$ and $f(-2)=0$

if $f(2)=0$ then $16a+16-12+2b-4=0$ or, $16a+2b=0$ or, $8a+b=0$

Again, if $f(-2)=0$ then $16a-16-12-2b-4=0$ or, $16a-2b=32$ or, $8a-b=16$

$$8a+b=0$$
$$8a-b=16$$
$$\text{(+)},\ 16a=16$$

or, $a=1$

$\therefore\quad 8(1)+b=0$ or, $b=-8$

$\therefore\quad a=1,\ b=-8$

3. If the two polynomials x^3+2x^2-px-7 and $x^3+px^2-12x+6$ are divided by $(x+1)$ and $(x-2)$ respectively then the remainders R_1 and R_2 are obtained respectively and if $2R_1+R_2=6$, then find the value of p .

Ans. Let, $f(x)=x^3+2x^2-px-7$ and $g(x)=x^3+px^2-12x+6$

If $f(x)$ and $g(x)$ are divided by $(x+1)$ and $(x-2)$ then remainders will be R_1 and R_2.

$\therefore$ $f(-1)=(-1)^3+2(-1)^2-p(-1)-7=R_1$

or, $-1+2+p-7=R_1$

or, $p-6=R_1$

Again, $g(2)=2^3+p(2)^2-12(2)+6=R_2$

or, $8+4p-24+6=R_2$

or, $4p-10=R_2$

Again, $2R_1+R_2=6$

or, $2(p-6)+4p-10=6$

or, $6p=28$

or, $p=\frac{28}{6}$

or, $p=\frac{14}{3}=4\frac{2}{3}$

$\therefore$ The value of p is $4\frac{2}{3}$.