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Where Minds Pollinate

Class 11
Mathematics

Chapter 5
Exercise 5.1

Notes

National Book Foundation

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Exercise 5.1

Q1 (i) $2x^3+3x^2-4x+1$ is ÷ by $x+2$.

put $x=-2$

$P(-2) = 2(-2)^3+3(-2)^3-4(-2)+1$

$\boxed{P(-2) = 5}$

which is required remainder

(ii) $x^4+2x^3-x^2+2x+3$ is ÷ by $x-2$

put $x=2$

$P(2) = (2)^4+2(2)^3-(2)^2+2(2)+3$

$P(2) = 35$

which is required remainder.

(Q2) Sol:- put $x=3$ in

$P(x) = x^3-2x^2-5x+6$

$P(3) = (3)^3-2(3)^2-5(3)+6$

$= 0$

so $(x-3)$ is a factor

(Q3) Put $\boxed{x=3}$

$P(x) = x^3-2x^2-5x+1$

$P(3) = (3)^3-2(3)^2-5(3)+1$

$= -5$

so $P(3) \neq 0$ so

$(x-3)$ is not a factor

Q4 Sol:- let $D = 4y^3 - 4y^2 + 2y + 10$, $r = 0$

$q = 4y^2 - 8y + 10$

$q \times d + r = D \Rightarrow q \times d + 0 = D \therefore r = 0$

So $d = \frac{\text{Divident}}{\text{quotient}}$

$$4y^2 - 8y + 10 \overline{)\, 4y^3 - 4y^2 + 2y + 10} \quad (y + 1)$$

$$\pm 4y^3 \mp 8y^2 \pm 10y$$

$$4y^2 - 8y + 10$$

$$\pm 4y^2 \mp 8y \pm 10$$

$$0$$

Hence other factor is $y + 1$ Ans

3 → q

2	7
d	6
	1 — r

@ $q \times d + r =$ divident

$(2)(3) + 1 = 7$

Q5) Sol $P(x) = x^3 + qx^2 - 7x + 6$

put $x = -1$

$$(-1)^3 + q(-1)^2 - 7(-1) + 6 = 0$$

$$-1 + q + 7 + 6 = 0$$

$$q + 12 = 0$$

$q = -12$ Ans

Q6 $P(x) = 2x^3 + 3x^2 - 3x - m$

$x = 2$

Given $P(2) = 16$

$$2(2)^3 + 3(2)^2 - 3(2) - m = 16$$

$$16 + 12 - 6 - m = 16$$

$m = 6$ Answer

(07) when $\boxed{x=1}$

$P(1)=(1)^3-7(1)+6$

$=1-7+6$

$P(1)=0$

when $\boxed{x=-2}$

$P(-2)=(-2)^3-7(-2)+6$

$\boxed{P(-2)=12}$

Hence only 1 is zeroof $P(x)$

(08) Sol:

put $x=2$, $P(x)=2x^3+3x^2-11x-6$

$P(2)=2(2)^3+3(2)^2-11(2)-6$

$=0$

now $(x-2)$

$$\begin{array}{r|l} (x-2) & 2x^3+3x^2-11x-6 \\ & \pm 2x^3 \mp 4x^2 \\ \hline & 7x^2-11x-6 \\ & \pm 7x^2 \mp 14x \\ \hline & 3x-6 \\ & \pm 3x \mp 6 \\ \hline & 0 \end{array}$$

$2x^2+7x+3$

$2x(x+3)+1(x+3)$

$(2x+1)(x+3)$

Hence $2,-3$ & $-1/2$ are zeros of $P(x)$

Put $2x+1=0$ $\boxed{x=-1/2}$, $\boxed{x=-3}$ Answer

Q9) $f(x) = x^3 - x^2 - 14x + 8$ in form $f(x) = (x-a)\,q(x) + r$ where $a = 4$

Sol:- $f(x) = (x-a)q(x) + r$

$x^3 - x^2 - 14x + 8 = (x-4)\,q(x) + r$

$x^2 + 3x - 2$

$x-4 \;\big|\; x^3 - x^2 - 14x + 8$

$\pm x^3 \mp 4x^2$

$3x^2 - 14x + 8$

$\pm 3x^2 \mp 12x$

$-2x + 8$

$\mp 2x \pm 8$

0

Hence

$(x-4)(x^2+3x-2) + 0$ Ans

4 - a

2 | 1 9 -8

divisor | remainder

$D = dq + r$

Q10 volume = (area of floor) x (height of room)

$x^3 + 11x^2 + 34x + 24 = \text{area} \times (x+1)$

$\text{area} = \dfrac{x^3 + 11x^2 + 34x + 24}{x+1}$

$x^2 + 10x + 24$

$x+1 \;\big|\; x^3 + 11x^2 + 34x + 24$

$\pm x^3 \pm 1x^2$

$10x^2 + 34x + 24$

$\pm 10x^2 \pm 10x$

$24x + 24$

$\pm 24x \pm 24$

0

area of floor $= x^2 + 10x + 24$

Ans