



Studybeesofficial

Where Minds Pollinate

Class 11
Mathematics
Chapter 5
Exercise 5.2
Notes

National Book Foundation

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Ex 5.2

Q1) $y^3 - 7y - 6$

$P(y) = y^3 - 7y - 6$

put $y = -1$

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

$P(-1) = 0$

$y+1$ is factor

$(y^2 - y - 6)$

$y^2 - 3y + 2y - 6$ $(y+1)$

$y(y-3) + 2(y-3)$

$(y+2)(y-3)$

hence

$(y+1)(y+2)(y-3)$

Ans

$y^2 = y - 6$

$y^3 - 7y - 6$

$\pm y^3 \pm y^2$

-6 ± 6

0 ± 0

$-y^2 - 7y - 6$

$\mp y^2 \mp y$

$-6y - 6$

$\mp 6y \mp 6$

0

2 $2x^3 - x^2 - 2x + 1$

put $x = 1$

$P(1) = 2(1)^3 - (1)^2 - 2(1) + 1$
 $= 0$

$(x-1)$ is factor

$2x^2 + x - 1$

$x-1$

$2x^3 - x^2 - 2x + 1$

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

$x^2 - 2x + 1$

$\pm x^2 \mp x$

$$\begin{array}{r} -x+1 \\ -x+1 \\ \hline 0 \end{array}$$

Hence $(2x^2+x-1)$

$$\begin{aligned} 2x^2+2x-x-1 \\ 2x(x+1)-1(x+1) \\ (2x-1)(x+1) \end{aligned}$$

Hence

$(x-1)(x+1)(2x-1)$ are factors

Q3) $2x^3+5x^2-9x-18$

$$P(2) = 2(2)^3 + 5(2)^2 - 9(2) - 18$$

$$P(2) = 0 \quad (x-2) \text{ is factor}$$

$$\begin{array}{r} (x-2) \overline{) 2x^3 - 5x^2 - 9x - 18} \\ \underline{+ 2x^3 - 4x^2} \\ 9x^2 - 9x - 18 \\ \underline{+ 9x^2 - 18x} \\ 9x - 18 \\ \underline{+ 9x - 18} \\ 0 \end{array}$$

$$9x^2 - 9x - 18$$

$$\pm 9x^2 - 18x$$

$$\begin{array}{r} 9x - 18 \\ \underline{+ 9x - 18} \\ 0 \end{array}$$

0

$$2x^2+9x+9$$

$$\begin{aligned} 2x(x+3)+3(x+3) \\ (2x+3)(x+3) \end{aligned}$$

Hence $(x-2)(2x+3)(x+3)$

Q4) $3x^3 - 5x^2 - 36$

~~P(3)~~ put $(x=3)$

$P(3) = 3(3)^3 - 5(3)^2 - 36$

$= 0$ is

$(x-3)$ is a factor

$3x^2 + 4x + 12$

$(x-3) \mid 3x^3 - 5x^2 - 36$

$\pm 3x^3 = 9x^2$

$4x^2 - 36$

$\pm 4x^2 = 12x$

$12x - 36$

$\pm 12x = 36$

0

Hence $(x-3)$

$3x^2 + 4x + 12$

~~middle term break not possible~~

~~so~~

$(x-3)(3x^2 + 4x + 12)$

Answer

Q5) $t^3 + t^2 + 3t - 5$

put $t=1$

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

$= 0$

$x-1$ is a factor

$$t^2 + 2t + 5$$

$$\begin{array}{r}
 (t-1) \overline{) t^3 + t^2 + 3t - 5} \\
 \underline{+ t^3 - t^2} \\
 2t^2 + 3t - 5 \\
 \underline{+ 2t^2 - 2t} \\
 5t - 5 \\
 \underline{+ 5t - 5} \\
 0
 \end{array}$$

$$(t-1)(t^2 + 2t + 5) \checkmark$$

Q 6 part

~~Q 6 part~~

$$\begin{array}{r}
 (x-2) \overline{) 2x^3 - 11x^2 - 6} \\
 \underline{+ 2x^3 - 4x^2} \\
 -11x^2 - 6x + 12 \\
 \underline{+ 11x^2 + 22x} \\
 -6x + 12 \\
 \underline{+ 6x + 12} \\
 0
 \end{array}$$

$$2x^2 - 11x - 6$$

$$2x^2 - 2x + 1x - 6$$

$$2x(x-6) + 1(x-6)$$

$$(2x+1)(x-6)$$

Hence

$$(x-2)(2x+1)(x-6) \checkmark$$

Q7: $P(x) = 2x^3 - 15x^2 + 27x - 10$ & $x = \frac{1}{2}$ is zero

then $2x = 1$ & $(2x - 1)$ is factor of $P(x)$

$$\begin{array}{r|l}
 x^2 - 7x + 10 & \\
 (2x-1) & 2x^3 - 15x^2 + 27x - 10 \\
 & \underline{+ 2x^3 - x^2} \\
 & -14x^2 + 27x - 10 \\
 & \underline{+ 14x^2 - 7x} \\
 & 20x - 10 \\
 & \underline{+ 20x - 10} \\
 & 0
 \end{array}$$

Hence

$$x^2 - 7x + 10$$

$$x^2 - 5x - 2x + 10$$

$$x(x-5) - 2(x-5)$$

$$(x-2)(x-5)$$

Hence factors are -

$$(x-2)(x-5)(2x-1)$$

Q8 if $h(x) = 4x^3 + 4x^2 + 73x + 36$

$$h\left(-\frac{1}{2}\right) = 0 \Rightarrow x = -\frac{1}{2}$$

$2x = -1$ $(2x+1)$ is a factor

$$2x^2 + x + 36$$

$$2x+1$$

$$4x^3 + 4x^2 + 73x + 36$$

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

$$2x^2 + 73x + 36$$

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

$$72x + 36$$

$$\pm 72x \pm 36$$

$$2x^2 + x + 36$$

0

Hence $(2x+1)(2x^2+x+36)$ are factors of h .