

4. Divide $3x^4 - 9x^2 + 27x - 66$ by $x - 2$. D M S A

$$\begin{array}{r}
 \overline{3x^3 + 6x^2 + 3x + 3} \\
 x - 2 \overline{)3x^4 + 0x^3 - 9x^2 + 27x - 66} \\
 \underline{-3x^4 \pm 6x^3} \\
 \phantom{x - 2 \overline{)3x^4}} + 6x^3 - 9x^2 \\
 \underline{-6x \pm 12x^2} \\
 \phantom{x - 2 \overline{)3x^4 + 0x^3}} + 3x^2 + 27x \\
 \underline{-3x^2 \pm 6x} \\
 \phantom{x - 2 \overline{)3x^4 + 0x^3 + 3x^2}} 33x - 66 \\
 \underline{-33x \pm 66}
 \end{array}$$

$$x^3 - y^3 = (x - y)(x^2 + xy + y^2)$$

$$x^3 + y^3 = (x + y)(x^2 - xy + y^2)$$

(ii) $64 - 125a^3$ Difference of 2 cubes

$$\begin{aligned}
 & (4)^3 - (5a)^3 \\
 &= (4 - 5a)(16 + 20a + 25a^2)
 \end{aligned}$$

$$x^3 - y^3 = (x - y)(x^2 + xy + y^2)$$

$$x^3 + y^3 = (x + y)(x^2 - xy + y^2) \leftarrow$$

(ii) $5x^3 + 40y^3$

Sum of 2 cubes
with HCF!

$$5[x^3 + 8y^3] = 5[(x)^3 + (2y)^3]$$

$$= 5[(x+2y)(x^2 - 2xy + 4y^2)]$$

10. Solve the simultaneous equations

$$\begin{aligned} 3x + 5y - z &= -3 & (1) \\ 2x + y - 3z &= -9 & (2) \\ x + 3y + 2z &= 7 & (3) \end{aligned}$$

Eliminate z

$$\begin{array}{r} (2) \quad 2x + y - 3z = -9 \\ -3(1) \quad -9x - 15y + 3z = +9 \\ \hline -7x - 14y = 0 \quad (4) \end{array}$$

$$\begin{array}{r} (3) \quad x + 3y + 2z = 7 \\ 2(1) \quad 6x + 10y - 2z = -6 \\ \hline 7x + 13y = 1 \quad (5) \end{array}$$

Solve (4) & (5)

$$\begin{array}{r} 7x + 13y = 1 \\ -7x - 14y = 0 \\ \hline -y = 1 \\ y = -1 \end{array}$$

Sub into (4)

$$\begin{array}{l} -7x - 14(-1) = 0 \\ -7x + 14 = 0 \\ x = 2 \end{array}$$

Sub into (1)

$$\begin{array}{l} 3(2) + 5(-1) - z = 3 \\ 6 - 5 - z = 3 \\ 1 - z = 3 \Rightarrow z = -2 \end{array}$$