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

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

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

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

$$(4)^3 - (5a)^3$$
$$= (4 - 5a)(16 + 20a + 25a^2)$$

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

(ii) $5x^3 + 40y^3$ Sum of 2 cubes with HCF!

$$5\left[x^3 + 8y^3\right] = 5\left[(x)^3 + (2y)^3\right]$$
$$= 5\left[(x+2y)(x^2 - 2xy + 4y^2)\right]$$

10. Solve the simultaneous equations

$3x + 5y - z = -3$ (1)
$2x + y - 3z = -9$ (2)
$x + 3y + 2z = 7.$ (3)

Eliminate z

(2) $2x + y - 3z = -9$
-3(1) $-9x - 15y + 3z = +9$
$-7x - 14y = 0$ (4)

(3) $x + 3y + 2z = 7$
2(1) $6x + 10y - 2z = -6$
$7x + 13y = 1$ (5)

Solve (4) & (5)

$7x + 13y = 1$
$-7x - 14y = 0$
$-y = 1$
$y = -1$

sub into (4)

$-7x - 14(-1) = 0$
$-7x + 14 = 0$
$x = 2$

sub into (1)

$3(2) + 5(-1) - z = 3$
$1 - z = 3 \Rightarrow z = -2$