

1 $P(x) = 5x^2 + 10x - 10$.

a) Degree of $P = 2$

b) Leading coefficient = 5

c) Leading term = $5x^2$

d) Constant term = -10

e) Leading coefficient (5) is positive and odd.

∴ The polynomial falls to the left and rises to the right.

2. a) $[x^3 - 3x^2 + 6x - 8] \div [x - 2]$

$$\begin{array}{r|rrrr} 2 & 1 & -3 & 6 & -8 \\ & & & & 1 \end{array}$$

$$\begin{array}{r|rrrr} 2 & 1 & -3 & 6 & -8 \\ & \downarrow & 2 & -2 & 8 \\ \hline & 1 & -1 & 4 & 0 \end{array} \quad \text{Remainder}$$

= $x^2 - x + 4$

b) $[x^4 - 2x^2 + x + 4] \div [x + 1]$

$$\begin{array}{r|rrrrr} -1 & 1 & 0 & -2 & 1 & 4 \\ & \downarrow & -1 & +3 & -4 & \\ \hline & 1 & -3 & 4 & 0 & \end{array} \quad \text{Remainder}$$

=

b) $[x^4 - 2x^2 + x + 4] \div [x + 1]$

$$\begin{array}{r|rrrrrr} -1 & 1 & 0 & -2 & 1 & 4 \\ & \downarrow & -1 & 1 & 1 & -2 \\ \hline & 1 & -1 & -1 & 2 & 2 \end{array} \quad \text{Remainder}$$

= $(x^3 - x^2 - x + 2) + \frac{2}{x+1}$

3a) $6x^{1000} - 17x^{501} + 10x - 6$

$x+1$

From Remainder theorem = $F(1)$

$F(x) = 6x^{1000} - 17x^{501} + 10x - 6$

$F(1) = 6(1)^{1000} - 17(1)^{501} + 10(1) - 6$

$F(1) = 6 - 17 + 10 - 6$

$F(1) = -7$

∴ Remainder = -7

= $x^3 - x + 4$

b) $x^{514} - 3x^{400} + x^9 + 2$

$x+1$
 $F(1) = (1)^{514} - 3(1)^{400} + (1)^9 + 2$

$F(1) = 1 - 3 + 1 + 2$

$F(1) = 1$ Remainder = 1

∴ $x^{514} - 3x^{400} + x^9 + 2$ is not divisible by $x+1$