ALGEBRA

1. In $p(x) = 5x^7 - 6x^5 + 7x - 6$, what is the
(i) coefficient of x^5
(ii) Degree of p(x)
(iii) Constant term

Given $p(x) = 5x^7 - 6x^5 + 7x - 6$

i) Coefficient of x^5 = -6.

2) Degree of $p(x)$ = The highest power of x = 7

3) Constant term = -6.

2. Find the zeroes of the polynomial $p(x) = x^2 + 5x + 6$?

Given polynomial $p(x) = x^2 + 5x + 6$

$\qquad$ Compare with $ax^2 + bx + c$

$a = 1, \, b = 5, \, c = 6$ $\qquad a \times c = 1 \times 6 = 6$

$\qquad\qquad\qquad\qquad\qquad 2 \times 3 = 6$

$x^2 + 5x + 6 = 0$

$x^2 + 2x + 3x + 6 = 0 \qquad$ and $2 + 3 = 5$

$x(x+2) + 3(x+2) = 0 \qquad 2x + 3x = 5x$

$(x+2)(x+3) = 0$

$x = -2$ and $x = -3 \implies$ Two zeroes.

3. If $p(t) = t^3 - 1$, find the values of $p(1)$, $p(-1)$, $p(0)$, $p(2)$, $p(-2)$?

Given that $p(t) = t^3 - 1$

$p(1) = (1)^3 - 1 = 1 - 1 = 0.$

$p(-1) = (-1)^3 - 1 = -1 - 1 = -2.$

$p(0) = (0)^3 - 1 = 0 - 1 = -1.$

$p(2) = (2)^3 - 1 = 8 - 1 = 7.$

$p(-2) = (-2)^3 - 1 = -8 - 1 = -9.$

4. Check whether -2 and 2 are the zeros of the polynomial $x^4 - 16$.

$$x^4 - 16 = 0$$

$$(x^2)^2 - (4)^2 = 0$$

$$a^2 - b^2 = (a+b)(a-b)$$

$$(x^2 + 4)(x^2 - 4) = 0$$

$$x^2 - 4 = 0$$

$$x^2 - 2^2 = 0$$

$$(x+2)(x-2) = 0$$

$$x + 2 = 0 \quad | \quad x - 2 = 0$$

$$x = -2 \quad | \quad x = 2$$

$$\therefore \text{Zeroes} = 2, -2.$$

$$x^2 - x - 6 = 0$$

$$a \times c = 1 \times -6 = -6$$

$$ax^2 + bx + c = 0$$

$$2 \times -3 = -6$$

$$a = 1, \ b = -1, \ c = -6$$

$$\text{and} \quad 2 - 3 = -1$$

$$x^2 - x - 6 = 0$$

$$2x - 3x = -x$$

$$x^2 + 2x - 3x - 6 = 0$$

$$x(x+2) - 3(x+2) = 0$$

$$(x+2)(x-3) = 0 \Rightarrow \boxed{x = 3, \ -2}$$