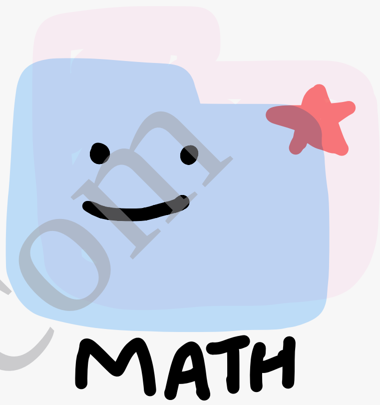
Polynomials
Ex. 2.2



Ex. 2.2

1. Let $p(x) = 5x - 4x^2 + 3$

(i) Put $x = 0$

$p(0) = 5(0) - 4(0)^2 + 3$

$= 3$

(ii) Put $x = -1$

$p(-1) = 5(-1) - 4(-1)^2 + 3$

$= -5 - 4 + 3$

$= -6$

(iii) Put $x = 2$

$p(2) = 5(2) - 4(2)^2 + 3$

$= 10 - 16 + 3$

$= -3$

2 (i) $p(y) = y^2 - y + 1$

$p(0) = 0^2 - 0 + 1 = 1$

$p(1) = 1^2 \cancel{-1} \cancel{+1} = 1$

$p(2) = 2^2 - 2 + 1 = 4 - 2 + 1 = 3$

(ii) $p(t) = 2 + t + 2t^2 - t^3$

$p(0) = 2 + 0 + 2(0)^2 - (0)^3 = 2$

$p(1) = 2 + 1 + 2(1)^2 - (1)^3 = 3 + 2 - 1 = 4$

$p(2) = 2 + 2 + 2(2)^2 - (2)^3 = 4 + \cancel{8} - \cancel{8} = 4$

(iii) $p(x) = x^3$

$p(0) = 0^3 = 0$

$p(1) = 1^3 = 1$

$p(2) = 2^3 = 8$

(iv) $p(x) = (x-1)(x+1)$

$p(0) = (0-1)(0+1) = (-1)\times 1 = -1$

$p(1) = (1-1)(1+1) = 0\times 2 = 0$

$p(2) = (2-1)(2+1) = 1\times 3 = 3$

3 (i) $p(x) = 3x+1$

$p\left(-\frac{1}{3}\right) = \cancel{3}^{1}\left(-\frac{1}{\cancel{3}_{1}}\right)+1$

$= -1+1$

$= 0$

$\therefore \left(-\frac{1}{3}\right)$ is a zero of $p(x)$.

(ii) $p(x) = 5x-\pi$

$p\left(\frac{4}{5}\right) = \cancel{5}^{1}\left(\frac{4}{\cancel{5}_{1}}\right)-\pi$

$= 4-\pi \neq 0$

$\therefore \left(\frac{4}{5}\right)$ is not a zero of $p(x)$

(iii) $p(x) = x^2-1$

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

$= 1-1$

$= 0$

$\therefore$ 1 is a zero of $p(x)$.

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

$= 1-1$

$= 0$

$\therefore (-1)$ is a zero of $p(x)$.

(iv) $p(x) = (x+1)(x-2)$

$p(-1) = (-1+1)(-1-2)$

$= 0 \times (-3)$

$= 0$

$\therefore (-1)$ is a zero of $p(x)$.

$p(2) = (2+1)(2-2)$

$= 3 \times 0$

$= 0$

$\therefore 2$ is a zero of $p(x)$.

(v) $p(x) = x^2$

$p(0) = 0^2$

$= 0$

$\therefore 0$ is a zero of $p(x)$.

(vi) $p(x) = lx + m$

$p\left(-\frac{m}{l}\right) = \cancel{l}\left(-\frac{m}{\cancel{l}}\right) + m$

$= -m + m$

$= 0$

$\therefore \left(-\frac{m}{l}\right)$ is a zero of $p(x)$.

(vii) $p(x) = 3x^2 - 1$

$p\left(-\frac{1}{\sqrt{3}}\right) = 3\left(-\frac{1}{\sqrt{3}}\right)^2 - 1$

$= \cancel{3} \times \frac{1}{\cancel{3}} - 1$

$= 1 - 1$

$p\left(-\frac{1}{\sqrt{3}}\right) = 0$

$\therefore \left(-\frac{1}{\sqrt{3}}\right)$ is a zero of $p(x)$.

$p\left(\frac{2}{\sqrt{3}}\right) = 3\left(\frac{2}{\sqrt{3}}\right)^2 - 1$

$= \cancel{3}^{1} \times \frac{4}{\cancel{3}_{1}} - 1$

$= 4 - 1$

$= 3 \neq 0$

$\therefore \left(\frac{2}{\sqrt{3}}\right)$ is not a zero of $p(x)$.

(viii) $p(x) = 2x + 1$

$p\left(\frac{1}{2}\right) = \cancel{2}^{1} \times \frac{1}{\cancel{2}_{1}} + 1$

$= 1 + 1$

$= 2 \neq 0$

$\therefore \left(\frac{1}{2}\right)$ is not a zero of $p(x)$.

4(i) $p(x) = x + 5$

$x + 5 = 0$

or $x = -5$

(-5) is the zero of $p(x)$.

(ii) $p(x) = x - 5$

$x - 5 = 0$

or $x = 5$

$\therefore 5$ is the zero of $p(x)$.

(iii) $p(x) = 2x + 5$

$2x + 5 = 0$

or $2x = -5$

or $x = -\frac{5}{2}$

$\therefore \left(-\frac{5}{2}\right)$ is the zero of $p(x)$

(iv) $p(x) = 3x - 2$

$3x - 2 = 0$

or $3x = 2$

or $x = \frac{2}{3}$

$\therefore \left(\frac{2}{3}\right)$ is the zero of $p(x)$.

(v) $p(x) = 3x$

$3x = 0$

or $x = \frac{0}{3}$

or $x = 0$

$\therefore 0$ is the zero of $p(x)$.

(vi) $p(x) = ax$

$ax = 0$

or $x = \frac{0}{a}$

or $x = 0$

$\therefore$ 0 is the zero of $p(x)$.

(vii) $p(x) = cx + d$

$cx + d = 0$

or $cx = -d$

or $x = -\frac{d}{c}$

$\therefore \left(-\frac{d}{c}\right)$ is the zero of $p(x)$.