$P[t] = 2t\,t + 2t^2 - t^3$ [at 2]

$= P[t] = 2 + t + 2t^2 - t^3$

$= 2 + 2 + 2[2]^2 - [2]^3$

$= 4 + 8 - 8$

4 //

3. $P[x] = x^3$ [at 0]

$= P[x] = x^3$

$= P[0] = 0^3$

0 //

$P[x] = x^3$ [at 1]

$= P[x] = x^3$

$= 1^3$

1 //

$P[x] = x^3$ [at 2]

$= P[2] = 2^3$

8 //

4. $P[x] = [x-1][x+1]$ [at 0]

$= P[x] = [x-1][x+1]$

$= 0[1-1][0+1]$

$= [-1][-1$

-1 //

$P[x] = [x-1][x+1]$ [at 1]

$= P[x] = [x-1][x+1]$

$= [1-1][1+1]$

$= [0][2]$

0 //

$P[x] = [x-1][x+1]$ [at 2]

$= P[2] = [2-1][2+1]$

$= [1][3]$

3 //

---

3. Verify whether the following are zeros of a polynomial indicated against them:-

1. $P[x] = 3x+1$ $x = -1/3$

$= 3\left[\frac{-1}{3}\right] + 1$

$= -1+1$

0 //

$\therefore -1/3$ will be zero of a polynomial.

2. $P[x] = 5x - \pi \quad x = 4/5$

$= P\left[\frac{4}{5}\right] = 5\left[\frac{4}{5}\right] - \frac{22}{7}$

$= \frac{4}{1} - \frac{22}{7}$

$= \frac{28 - 22}{7}$

$= \frac{6}{7} \neq 0$

$\therefore \frac{4}{5}$ is not a zero of a polynomial.

3. $P[x] = x^2 - 1 \quad x = 1, -1$

$= P[1] = 1^2 - 1$

$= 1 - 1$

0 //

$= P[-1] = [-1^2] - 1$

$= 1 - 1$

0 //

$\therefore$ Both 1 and -1 are zeroes of a polynomial.

4. $P[x] = [x+1][x+2]$ $x = -1, 2$

$= P[x] = [x+1][x-2]$

$= P[-1] = [-1+1][-1-2]$

$= 0[-3]$

0 //

$= P[x] = [x+1][x-2]$

$= P[2] = [2+1][2-2]$

$= [3][0]$

0 //

∴ -1 and 2 are zeros of polynomial.

5. $P[x] = x^2$ $x = 0$

$= P[0] = 0^2$

0 //

∴ It is zeros of a polynomial.

6. $P[x] = lx + m$ $x = -m/l$

$= P\left[\frac{-m}{l}\right] = l\left[\frac{-m}{l}\right] + m$

$= -m + m$

0 //

∴ It is zeros of a polynomial.

7. $p(x) = 3x^2 - 1$ $x = -1/\sqrt{3}, 2/\sqrt{3}$

$= p\left[\frac{-1}{\sqrt{3}}\right] = 3\left[\frac{-1}{\sqrt{3}}\right]^2 - 1$

$= 3\left[\frac{[-1]^2}{[\sqrt{3}]^2}\right] - 1$

$= 3\left[\frac{1}{3}\right] - 1$

$= 1 - 1$

0 //

∴ It is zero of a polynomial.

$= p\left[\frac{2}{\sqrt{3}}\right] = 3\left[\frac{2}{\sqrt{3}}\right]^2 - 1$

$= 3\left[\frac{[2]^2}{[\sqrt{3}]^2}\right] - 1$

$= 3\left[\frac{4}{3}\right] - 1$

$= 4 - 1$

3 //

∴ It is not a zeros of a polynomial.