



a)  $1 + 4 + 9 + \dots$

i.  $T_n = a + (n-1)d$

$$a = -1 \quad n = 60 \quad d = 5$$

$$\begin{aligned} \therefore T_{60} &= -1 + (60-1)5 \\ &= -1 + 295 \\ &= 294 \end{aligned}$$

$\therefore$  the 60<sup>th</sup> term = 294.

ii.  $S_n = \frac{n}{2} [2a + (n-1)d]$

$$n = 60 \quad a = -1 \quad d = 5$$

$$\begin{aligned} \therefore S_{60} &= \frac{60}{2} [2(-1) + (60-1)5] \\ &= 30[-2 + 295] \\ &= 30(293) \\ &= 8790 \end{aligned}$$

b)  $1.23 \div e^1$

$$1.23e = e^d$$

$$= 0.452491712$$



i.  $y = x^3 + x^2 - x + 2$

$$y' = 3x^2 + 2x - 1$$

$$\underbrace{(3x-1)}_3 \underbrace{(x+1)}_2 = 0 \quad \begin{matrix} x-3 \\ +2 \end{matrix}$$

$$\underbrace{(3x-1)}_3 \underbrace{(x+1)}_2 = 0$$

$$\therefore x = \frac{1}{3} \text{ and } -1$$

$$\begin{aligned} y &= \left(\frac{1}{3}\right)^3 + \left(\frac{1}{3}\right)^2 - \left(\frac{1}{3}\right) + 2 \\ &= \frac{1}{3} + \frac{1}{3} - \frac{1}{2} + 2 \\ &= 2\frac{1}{6} \end{aligned}$$

$$\therefore \text{Point } \left(\frac{1}{3}, 2\frac{1}{6}\right) = B.$$

$$\text{for } x = -1$$

$$\begin{aligned} y &= (-1)^3 + (-1)^2 - (-1) + 2 \\ &= -1 + 1 + 1 + 2 \\ &= 3 \end{aligned}$$

$$\therefore \text{Point } (-1, 3) = A.$$

ii.  $y' = 3x^2 + 2x - 1$

$$y'' = 6x + 2$$

$$\text{for point } \left(\frac{1}{3}, 2\frac{1}{6}\right), y'' = 6\left(\frac{1}{3}\right) + 2 = 4 \rightarrow > 0 \rightarrow \cup$$

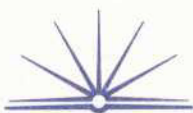
MINIMUM  
TURNING PT.

$$\text{for point } (-1, 3), y'' = 6(-1) + 2 = -4 \rightarrow < 0 \rightarrow \cap$$

CONCAVE  
DOWN

MAXIMUM  
T.P.

CONCAVE UP



so, point A is concave up, with  $x = -1$

iii.  $x^3 + x^2 - x + 2 = k$

By  $2(x^2 + x - 1) + 2 = k$

$x(x-1)(x-1) + 2 = k$

~~$3x^2 + x^3 - 1 = k$~~