

a) (i) ~~$T_n = a + (n-1)r$~~

~~$T_{60} = -1 + (59)5$~~

$$T_n = a + (n-1)r$$

$$T_{60} = -1 + (59)5$$

$$= -1 + 295$$

$$= 294$$

\therefore The 60th term is 294.

(ii) $S_n = a + (r-d)d$



$$c) \quad y = x^3 + x^2 - x + 2$$

(1) A and B are turning pts, and hence,
 $y' = 0$ at both. Since A is a
max. turning pt. $y'' < 0$ at A and
since B is a min. turning pt. $y'' > 0$ at
B.

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

For $y' = 0$

$$3x^2 + 2x - 1 = 0$$

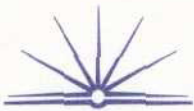
~~Use the~~

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-2 \pm \sqrt{4 - 4 \times 3 \times -1}}{6}$$

$$= \frac{-2 \pm \sqrt{\cancel{4} + 12}}{6}$$

$$= \frac{-2 \pm \sqrt{16}}{6}$$



$$= \frac{-2 + 4}{6}$$

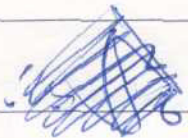
$$= \frac{2}{6}$$

sub $\frac{2}{6}$ into eqn. to find pt.

$$y = \left(\frac{2}{6}\right)^3 + \left(\frac{2}{6}\right)^2 - \frac{2}{6} + 2$$

$$= \frac{8}{216} + \frac{4}{36} - \frac{2}{6} + 2$$

$$= \frac{8}{216} + \frac{24}{216} - \frac{72}{216} + 2$$



$$y = \left(\frac{2}{6}\right)^3 + \left(\frac{2}{6}\right)^2 - \frac{2}{6} + 2$$

$$= \frac{8}{216} + \frac{4}{36} - \frac{2}{6} + 2$$

$$= \frac{8}{216} + \frac{24}{216} - \frac{72}{216} + 2$$

$$= \frac{104}{216} - \frac{40}{216} + 2$$

$$B\left(\frac{1}{3}, 1\frac{176}{216}\right)$$

\therefore ~~is a turning pt.~~ is a turning pt. This could be pt B.
as shown on the diagram.

$$\text{For } \frac{-2 - 4}{6}$$

$$= -\frac{6}{6}$$

\therefore a turning occurs when $x = -1$

sub $x = -1$ into y .

$$y = (-1)^3 + (-1)^2 - (-1) + 2$$

$$= -1 + 1 + 1 + 2$$

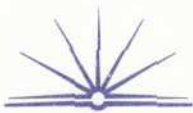
$$= 3$$

\therefore a turning pt. also occurs at $(-1, 3)$

\therefore pt A $(-1, 3)$ as shown roughly on the diagram.

~~point~~

(ii) As pt B $\left(\frac{1}{3}, 1\frac{176}{216}\right)$ is a minimum, the curve is concave up for $x > \frac{1}{3}$



$$(ii) \quad x^3 + x^2 - x + 2 = k$$