

a)  $2, 3.5, 5, 6.5, \dots, +32$

$a = 2$        $d = 1.5$

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

(i)

~~$$S_n = \frac{n}{2} (2a + (n-1)d)$$~~

~~$$\begin{aligned} S_{32} &= \frac{1}{2} (32 + (31)1.5) \\ &= 16 (50.5) \\ &= 808. \end{aligned}$$~~

$$T_n = 2 + (n-1)1.5$$

$$T_n = 32$$

$$32 = 2 + (n-1)1.5$$

$$30 = (n-1)1.5$$

$$30 = 1.5n - 1.5$$

$$31.5 = 1.5n$$

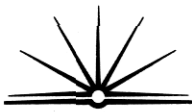
$$\therefore n = 21.$$

$\therefore$  Catherine throws the stick  
21 times.

(ii)

$$2(2)^2 + 2(3.5)^2 + 2(5)^2 + \dots$$

~~$$= \frac{2 \times 25}{4} = \frac{12.25}{12.25}$$~~



$$\therefore 4, 7, 10, 13, \dots$$

$$\therefore d = 3$$

$$\therefore S_n = \frac{n}{2} (2a + (n-1)d)$$

$$S_{21} = \frac{21}{2} (8 + (20)3)$$

$$= 10.5 \times 68$$

$$= 714 \text{ m}$$

$\therefore$  the dog runs

714 m, altogether.

b) arc length =  $r\theta$

$$\therefore 38 = 20\theta$$

$$\therefore \theta = 1.9^\circ$$

~~$\therefore \theta = \text{NAUGHTY degrees}$~~

$$\therefore \theta = 108^\circ 51'$$

$$= 109^\circ \text{ (nearest degree)}$$

c)  ~~$y = x^2 - 8x + 4$~~

~~$$x^2 - 8x = -y + 4$$~~

~~$$y = x(x-4) + 4$$~~

~~$$y-4 = x(x-4)$$~~



$$c) \quad x = \frac{-b}{2a} \quad y = x(x-8) + 4$$

$$(i) \quad \therefore \text{vertex is} \\ (8, 0)$$

$$(ii) \quad \cancel{x^2} \\ \cancel{x(x-8)} = 4 - y$$

$$a = 1$$

$$\therefore \text{focus} =$$

$$(9, 0)$$

$$\cancel{y - 4 = x}$$

$$x^2 = -y - 8x + 4$$

$$x(x-8) = y + 4$$