



$$a) (i) 2, 3, 5, 5, \dots, 32$$

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

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

$$32 = 2 + \frac{3}{2}n - \frac{3}{2}$$

$$\frac{3}{2}n = 31\frac{1}{2}$$

$$n = 21$$

\therefore Catrine threw the stick 21 times.

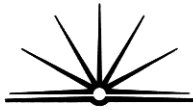
$$(ii) 4, 7, 10, \dots, 64$$

$$S_n = \frac{n}{2}(a + l)$$

$$S_{21} = \frac{21}{2}(4 + 64)$$

$$= 714$$

\therefore Dog ran a total of 714 m



b) ~~$2\theta = 38$~~

$$2\theta = 38$$

$$\therefore 2\theta = 38$$

$$\theta = 1.9^\circ$$

$$\frac{x}{180} = 1.9^\circ$$

~~$x = 342$~~

$$x = 342^\circ$$

$$\therefore \theta = 342^\circ$$

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

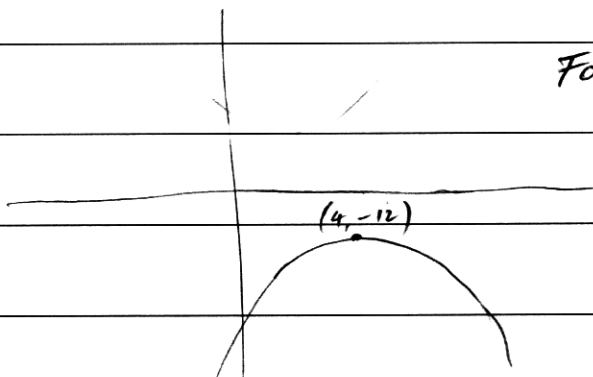
$$\text{Vertex } \left(-\frac{b}{2a}, f\left(-\frac{b}{2a}\right) \right)$$

$$\therefore -\frac{b}{2a} = \frac{8}{2} = 4$$

$$\therefore f\left(-\frac{b}{2a}\right) = -12$$

$$\therefore \text{Vertex } (4, -12)$$

Focal distance =



$$x^2 - 8x = y - 4$$
$$(x - 4)^2 = (y - 16)$$

$$4a = 1$$

$$\therefore a = \frac{1}{4}$$

$$\therefore \text{Focal point } \left(4, -12\frac{1}{4} \right)$$