



### Question 6

(a)  $y = \sqrt{4-x^2}$

$$= 4 - x^2$$

$$0 = 4 - x^2$$

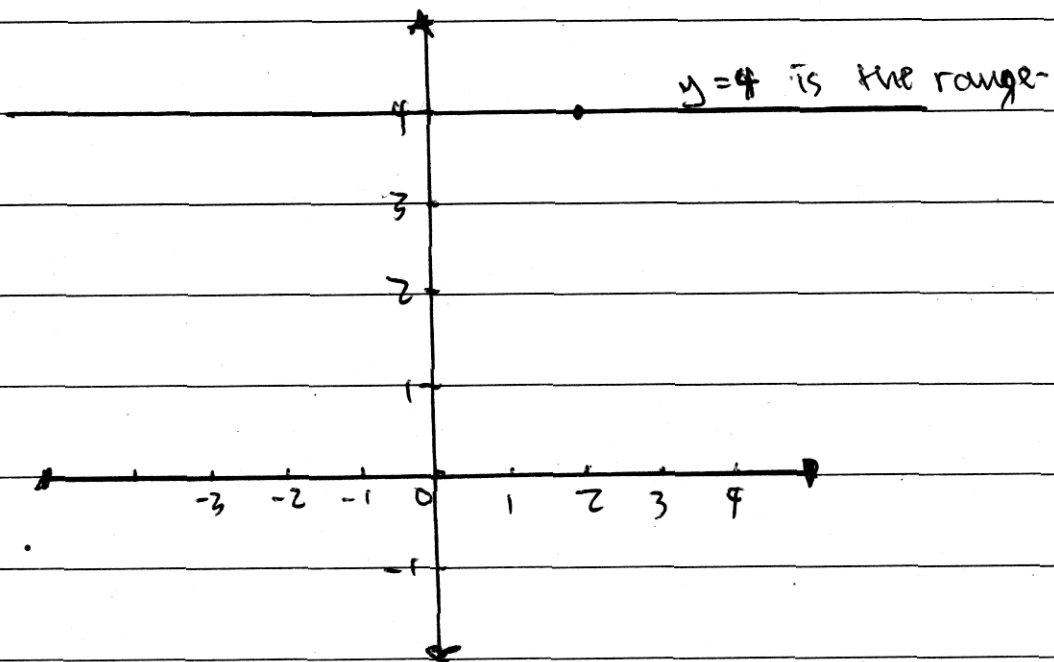
$$= 4 - 0^2$$

$$x^2 = 4$$

$$y = 4$$

$$x = 2$$

$$\therefore x = 2 \quad y = 4$$



(b)  $f'(x) = 3(x+1)(x-3)$

$y = f(x)$  passes through the pt  $(0, 12)$

i)  $f'(x) = 3(0+1)(0-3)$

$$12 = 3(x+1)(x-3)$$

$$= 3(0^2 - 0 + 0 - 3)$$

$$12 = 3(x^2 - 3x + x - 3)$$

$$= 3(-3)$$

$$12 = 3(x^2 - 2x - 3)$$

$$y = -9$$

$$12 = 3x^2 - 6x - 9$$

$$-3x^2 + 6x = -9 - 12$$

$$3x(-x+2) = -21$$

∴

ii).

$$\textcircled{c} \quad y = \frac{x^4}{4} \quad x=0 \quad x=2$$

$$V = \pi \int y^2 dx$$

$$= \pi \int_0^2 \frac{x^4}{4} dx$$

$$= \pi \int_0^2 \frac{x^5}{4} dx$$

$$= \pi \left[ \frac{x^5}{4} \right]_0^2$$

$$= \pi \left[ \frac{2^5}{4} - \frac{0^5}{4} \right]$$

$$= \pi \times 1.6$$

$$= 5.027 \text{ cubic units.}$$