

## Section 2.1

$$2.) g(x) = x^2$$

$$a.) \text{ARC} = \frac{g(1) - g(-1)}{1 - (-1)} = \frac{1 - 1}{2} = \frac{0}{2} = 0$$

$$b.) \text{ARC} = \frac{g(0) - g(-2)}{0 - (-2)} = \frac{0 - 4}{0 + 2} = -2$$

$$4.) g(t) = 2 + \cos t$$

$$a.) \text{ARC} = \frac{g(\pi) - g(0)}{\pi - 0} = \frac{(2 + \cos \pi) - (2 + \cos 0)}{\pi}$$

$$= \frac{2 + (-1) - 2 - (1)}{\pi} = \frac{-2}{\pi}$$

$$b.) \text{ARC} = \frac{g(\pi) - g(-\pi)}{\pi - (-\pi)}$$

$$= \frac{(2 + \cos \pi) - (2 + \cos(-\pi))}{2\pi}$$

$$= \frac{2 + (-1) - 2 - (-1)}{2\pi} = \frac{0}{2\pi} = 0$$

$$5.) R(\theta) = \sqrt{4\theta + 1}$$

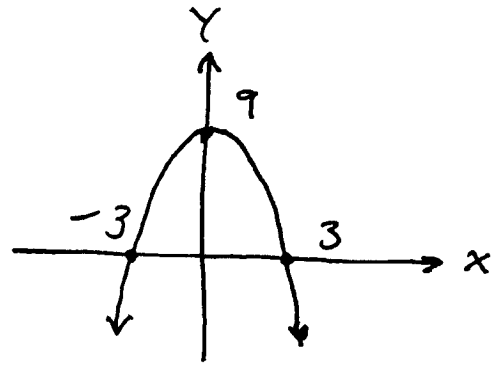
$$\text{ARC} = \frac{R(2) - R(0)}{2 - 0} = \frac{\sqrt{9} - \sqrt{1}}{2} = \frac{3 - 1}{2} = 1$$

# Worksheet 1

1.) a.)  $f(x) = 9 - x^2$   
(parabola)

Domain : all  $x$ -values

Range :  $y \leq 9$



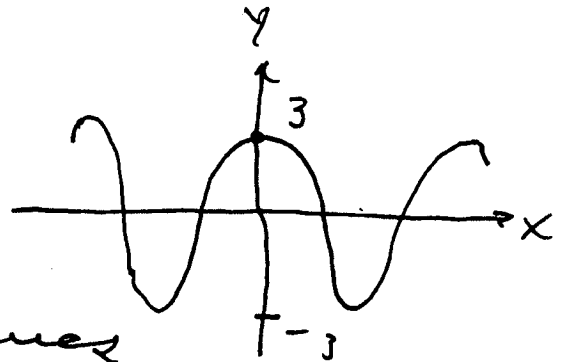
b.)  $f(x) = 3 \cos 4x$ ;

$-1 \leq \cos 4x \leq +1 \rightarrow$

$-3 \leq 3 \cos 4x \leq 3$  ;

Domain : all  $x$ -values

Range :  $-3 \leq y \leq +3$



c.)  $y = 5 + \sqrt{16 - x}$  ;  $16 - x \geq 0 \rightarrow$   
 $x \leq 16$  so

Domain :  $x \leq 16$  ;

$0 \leq \sqrt{16 - x} < \infty$  so

$5 \leq 5 + \sqrt{16 - x} < \infty$  ,

Range :  $y \geq 5$

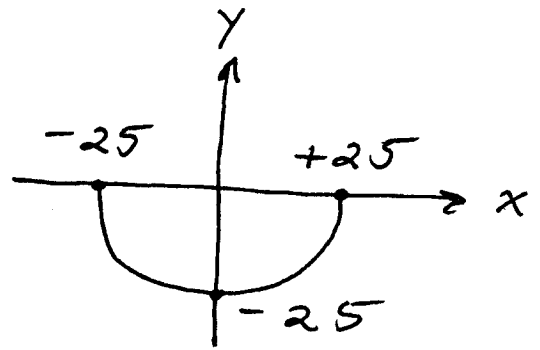
d.)  $y = -\sqrt{625 - x^2} \rightarrow$

$y^2 = 625 - x^2 \rightarrow x^2 + y^2 = 25^2$

(circle centered at  $(0, 0)$

with radius  $r = 25$ ) ; so

$y = -\sqrt{625 - x^2}$   
 is bottom half  
 of circle ;



Domain :  $-25 \leq x \leq 25$

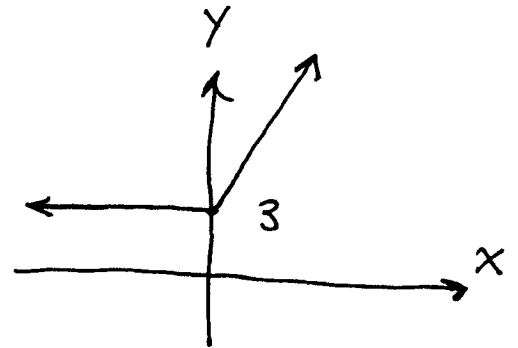
Range :  $-25 \leq y \leq 0$

e.) Recall :  $|x| = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0 \end{cases}$  ;

$$y = x + |x| + 3$$

$$= \begin{cases} x + (x) + 3 & \text{if } x \geq 0 \\ x + (-x) + 3 & \text{if } x < 0 \end{cases}$$

$$= \begin{cases} 2x + 3 & \text{if } x \geq 0 \\ 3 & \text{if } x < 0 \end{cases}$$



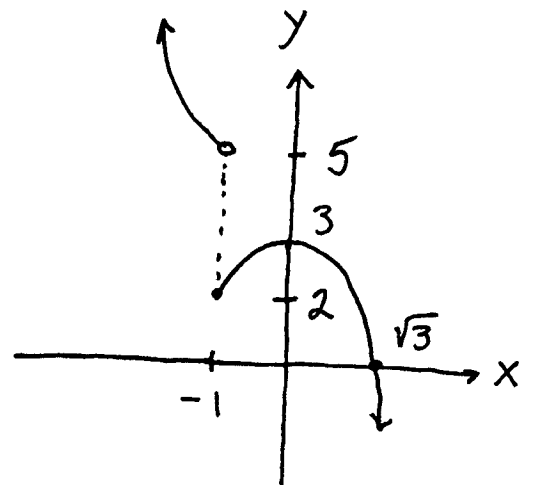
Domain : all  $x$ -values

Range :  $y \geq 3$

$$f.) f(x) = \begin{cases} x^2 + 4 & \text{if } x < -1 \\ 3 - x^2 & \text{if } x \geq -1 \end{cases}$$

Domain : all  $x$ -values

Range :  $y \leq 3, y > 5$





$$\begin{aligned} &= \frac{x - 2(3-x)}{x + 4(3-x)} = \frac{x - 6 + 2x}{x + 12 - 4x} = \frac{3x - 6}{12 - 3x} \\ &= \frac{3(x-2)}{3(4-x)} = \frac{x-2}{4-x} \end{aligned}$$