

#5 a)  $y = 2 - 4x$  - is a function - line with defined slope

b)  $y = 2x^2 + 3x - 5$  - is a function - parabola

c)  $x^2 + y^2 = 25$  - is not a function - circle

#6 If  $f(x) = x - 5$ , find

a)  $f(8) = 8 - 5 = 3$     b)  $f(5) = 5 - 5 = 0$     c)  $f(1) = 1 - 5 = -4$

d)  $f(0) = 0 - 5 = -5$     e)  $f(-2) = -2 - 5 = -7$

7. If  $g(x) = 3x + 4$ , find

a)  $g(2) = 3(2) + 4 = 10$     b)  $g(0) = 0 + 4 = 4$     c)  $g(-1) = -3 + 4 = 1$

d)  $g(-3) = -9 + 4 = -5$     e)  $g(0.5) = 3(0.5) + 4 = 1.5 + 4 = 5.5$

8. If  $f(x) = x^2 + 2x - 1$ , find

a)  $f(0) = -1$     b)  $f(5) = 25 + 10 - 1 = 34$     c)  $f(-2) = 4 - 4 - 1 = -1$

d)  $f(1.5) = 1.5^2 + 2(1.5) - 1 = 2.25 + 3 - 1 = 4.25$     e)  $f(-0.5) = (-0.5)^2 + 2(-0.5) - 1 = 0.25 - 1 - 1 = -1.75$

Pg. 179 #12cd, 17, 20, 22, 24

12.  $f(x) = 4x + 1$  find  $x$  when  $f(x)$  is

c)  $4x + 1 = 53$   
 $4x = 52$   
 $x = 13$

d)  $4x + 1 = -19$   
 $4x = -20$   
 $x = -5$

17. A vertical line is always of the form  $x = a$ .  
 (Just background from q1.9 ... not necessary for this question.) where  $a$  is the  $x$ -intercept.

A vertical line is not a function because it does not pass the vertical line test... there are an infinite number of points with the same  $x$ -value and different  $y$ -values.

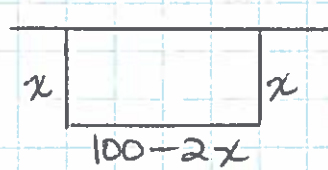
20.  $A(r) = \pi r^2$

↳ just like  $y = \pi x^2$  ← constant

... graph is a parabola.  
 when radius is 0, Area is 0  
 " " " 1, " "  $\pi$   
 " " " 2, " "  $4\pi$   
 etc.

Domain =  $\{r \in \mathbb{R} \mid r \geq 0\}$  ← restriction because

Range =  $\{A \in \mathbb{R} \mid A \geq 0\}$  it makes no sense to have a negative radius.

24.  a) Let  $x$  m be the width of the corral.  
 $A = lw$   
 $A(x) = x(100 - 2x)$   
 $A(x) = 100x - 2x^2$

b) for max/min, complete the square.

$$\begin{aligned} A(x) &= -2x^2 + 100x \\ &= -2(x^2 - 50x + 625 - 625) \\ &= -2(x - 25)^2 + 1250 \end{aligned}$$

$$\begin{aligned} \hookrightarrow x &= 25 \quad 100 - 2(25) \\ &= 50 \end{aligned}$$

$\therefore$  the maximum area of  $1250 \text{ m}^2$  occurs when the corral is  $25 \text{ m} \times 50 \text{ m}$ .

Pg. 181 #25, 29

25.

$2x - 3y = 6$  is a sloped line so it does model a function.

$$-3y = -2x + 6$$

$$y = \frac{-2x}{-3} + \frac{6}{-3}$$

$$y = \frac{2}{3}x - 2$$

$$\therefore f(x) = \frac{2}{3}x - 2$$

26.  $f(x) = x^2 + 4x$

a)  $f(x) = 5$

$$x^2 + 4x = 5$$

$$x^2 + 4x - 5 = 0$$

$$(x+5)(x-1) = 0$$

$$x = -5 \text{ or } x = 1.$$

29.

$$\frac{f(4) - f(1)}{4 - 1}$$

is the slope of ~~the~~ the

line described by  $f(x) = 6x - 5$

NOTE:  $f(4) = 6(4) - 5$   
 $= 24 - 5$   
 $= 19$   
 $(4, 19)$

$f(1) = 6(1) - 5$   
 $= 1$   
 $(1, 1)$

recall:  $m = \frac{y_2 - y_1}{x_2 - x_1}$

$$m = \frac{19 - 1}{4 - 1}$$
$$= \frac{18}{3}$$
$$= 6$$

slope (11)