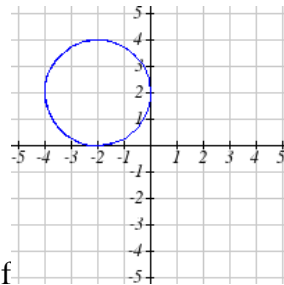
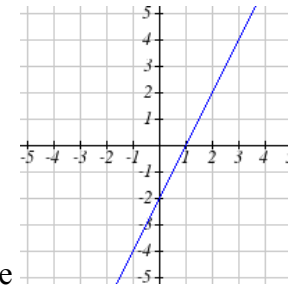
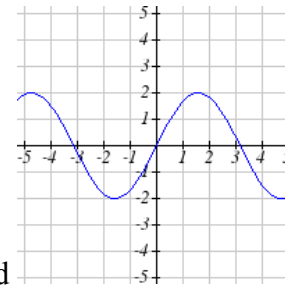
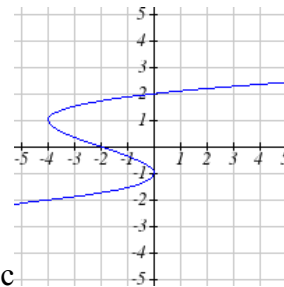
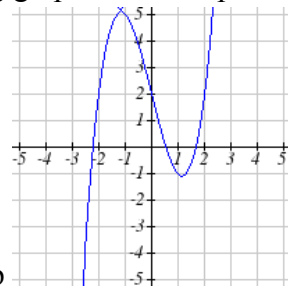
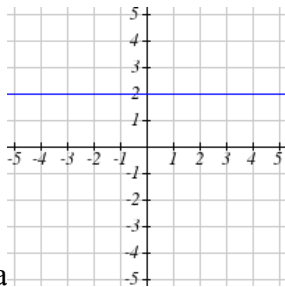
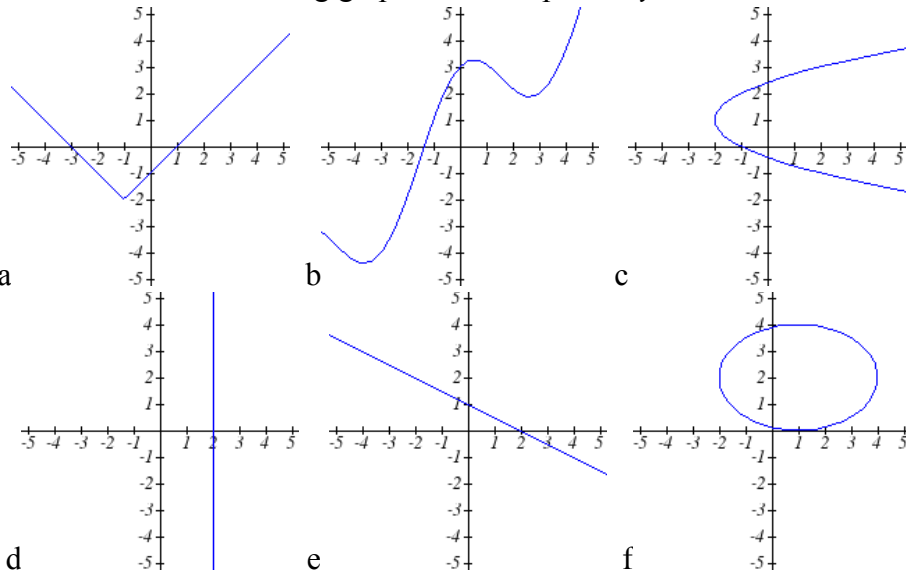


## HW 1.1.2: Function Identification

- The amount of paper,  $R$ , recycled by a city with population  $p$  is given by  $R = f(p)$ .  $R$  is measured in tons per week, and  $p$  is measured in thousands of people.
  - The city of Galveston has a population of 50,000 and recycles 7 tons of garbage each week. Express this information in terms of the function  $f$ .
  - Explain the meaning of the statement  $f(20) = 3$ .
- The amount of cubic yards of concrete,  $C$ , needed to construct a parking lot with area  $a$  square feet is given by  $C = f(a)$ .
  - A garden with area 3000 ft<sup>2</sup> requires 20 cubic yards of concrete. Express this information in terms of the function  $f$ .
  - Explain the meaning of the statement  $f(600) = 4$ .
- Let  $f(t)$  be the number of wolves in Yellowstone National Park  $t$  years after 1995. Explain the meaning of each statement:
  - $f(0) = 21$
  - $f(8) = 174$
- Let  $h(t)$  be the height above ground, in feet, of an apple  $t$  seconds after falling from a tree. Explain the meaning of each statement:
  - $h(0.5) = 12$
  - $h(1) = 4$
- Select all of the following graphs which represent  $y$  as a function of  $x$ .



6. Select all of the following graphs which represent  $y$  as a function of  $x$ .



7. Select all of the following tables which represent  $y$  as a function of  $x$ .

a. 

$x$	2	4	16
$y$	10	16	22

b. 

$x$	2	4	6
$y$	0	-4	0

c. 

$x$	6	4	6
$y$	10	16	22

8. Select all of the following tables which represent  $y$  as a function of  $x$ .

a. 

$x$	9	16	36
$y$	3	4	3

b. 

$x$	9	16	16
$y$	1	2	4

c. 

$x$	9	16	36
$y$	3	4	6

9. Select all of the following tables which represent  $y$  as a function of  $x$ .

a. 

$x$	$y$
0	6
1	9
2	13
1	17
0	21

b. 

$x$	$y$
0	11
1	7
2	2
3	-3
4	2

c. 

$x$	$y$
0	19
1	15
2	10
3	4
1	0

d. 

$x$	$y$
-1	8
0	14
1	22
2	30
3	40

10. Select all of the following tables which represent  $y$  as a function of  $x$ .

a. 

$x$	$y$
-3	9
0	14
3	28
6	11
9	16

b. 

$x$	$y$
3	18
0	25
3	9
6	17
9	22

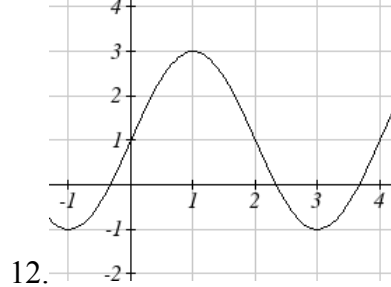
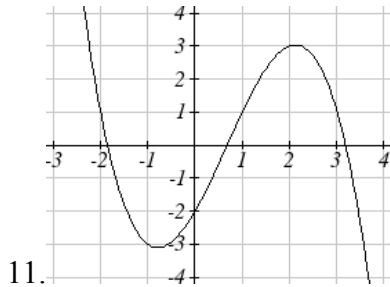
c. 

$x$	$y$
-4	11
-1	30
2	27
5	22
8	21

d. 

$x$	$y$
-4	24
0	7
4	27
8	23
12	12

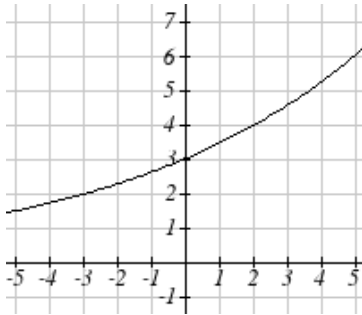
Given each function  $f(x)$  graphed, evaluate  $f(-2)$  and  $f(0)$



13. Given the function  $g(x)$  graphed here,

a. Evaluate  $g(-3)$

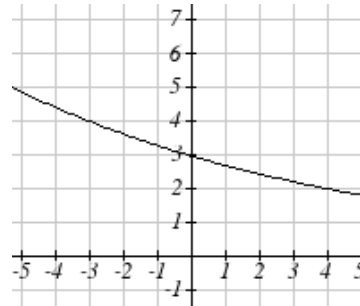
b. Solve  $g(x) = 3$



14. Given the function  $f(x)$  graphed here.

a. Evaluate  $f(0)$

b. Solve  $f(x) = 2$



15. Based on the table below,

a. Evaluate  $f(2)$

b. Solve  $f(x) = 7$

$x$	-3	-2	-1	0	1	2	3
$f(x)$	7	13	27	42	36	31	45

16. Based on the table below,

a. Evaluate  $f(14)$

b. Solve  $f(x) = 3$

$x$	0	2	4	6	8	10	12	14	16	18
$f(x)$	3	12	19	11	0	13	21	27	25	23

For each of the following functions, evaluate:  $f(-4)$ ,  $f(-2)$ ,  $f(0)$ ,  $f(2)$ , and  $f(4)$

17.  $f(x) = 3x - 7$

18.  $f(x) = 13 - 4x$

19.  $f(x) = -2x^2 + 5x + 1$

20.  $f(x) = x^2 - 3x + 9$

21.  $f(x) = 2x^3 + x^2$

22.  $f(x) = x^4 - x$

23.  $f(x) = 2 - \sqrt{x+5}$

24.  $f(x) = 1 + \sqrt[3]{x+4}$

25.  $f(x) = (x+1)(x-1)$

26.  $f(x) = (x-2)(x+6)^2$

27.  $f(x) = \frac{x+2}{x-5}$

28.  $f(x) = \frac{x+1}{x+7}$

29.  $f(x) = \left(\frac{1}{3}\right)^x$

30.  $f(x) = (-1)^x$

31. Suppose  $f(x) = 2x^2 - 3x + 2$ . Compute the following:

a.  $f(2) + f(4)$       b.  $f(2) - f(4)$

32. Suppose  $f(x) = -x^2 + 6x - 1$ . Compute the following:

a.  $f(1) + f(3)$       b.  $f(1) - f(3)$

33. Let  $f(s) = 6s - 7$

a. Evaluate  $f(-1)$       b. Solve  $f(t) = -1$

34. Let  $g(t) = 4t - 3$

a. Evaluate  $g(9)$       b. Solve  $g(p) = 9$

Selected Answers:

1. (a)  $f(50) = 7$ , because the input 50 (in thousands of people) gives the output 7 (in tons of paper)  
 (b)  $f(20) = 3$ , means that 20,000 people recycle 3 tons of paper per week.
3. (a) In 1995 (0 years after 1995) there were 21 wolves in the park.  
 (b) In 2003 (8 years after 1995) there were 174 wolves in the park.

5. Graphs (a) (b) (d) and (e) represent  $y$  as a function of  $x$  because for every value of  $x$  there is only one value for  $y$ . Graphs (c) and (f) are not functions because they contain points that have more than one output for a given input, or values for  $x$  that have 2 or more values for  $y$ .

7. Tables (a) and (b) represent  $y$  as a function of  $x$  because for every value of  $x$  there is only one value for  $y$ . Table (c) is not a function because for the input  $x=6$ , there are two different outputs for  $y$ .

9. Tables (b) and (d) represent  $y$  as a function of  $x$  because for every value of  $x$  there is only one value for  $y$ . Table (a) is not a function because for the input  $x=0$  and  $x=1$ , there are two different outputs for each  $y$ . Table (c) is also not a function because for the input  $x=1$ , there are two different outputs for  $y$ .

11. (a)  $f(-2) = 1$  (b)  $f(0) = -2$

13. (a)  $g(-3) = 2$  (b)  $g(0) = 3$

15. (a)  $f(2) = 31$  (b)  $f(-3) = 7$

17.  $f(-4) = 3(-4) - 7 = -12 - 7 = -19, f(-2) = -13, f(0) = -7, f(2) = -1, f(4) = 5$

19.  $f(-4) = -2(-4)^2 + 5(-4) + 1 = -2(16) - 20 + 1 = -32 - 19 = -51, f(-2) = -17, f(0) = 1, f(2) = 3, f(4) = -11$

21.  $f(-4) = 2(-4)^3 + (-4)^2 = 2(-64) + 16 = -128 + 16 = -112, f(-2) = -12, f(0) = 0, f(2) = 20, f(4) = 144$

23.  $f(-4) = 2 - \sqrt{(-4) + 5} = 2 - \sqrt{1} = 2 - 1 = 1, f(-2) = 2 - \sqrt{3} \approx 0.27, f(0) = 2 - \sqrt{5} \approx -0.24, f(2) = 2 - \sqrt{7} \approx -0.65, f(4) = 2 - \sqrt{9} = -1$

25.  $f(-4) = (-4 + 1)(-4 - 1) = (-3)(-5) = 15, f(-2) = 3, f(0) = -1, f(2) = 3, f(4) = 15$

27.  $f(-4) = \frac{(-4)+2}{(-4)-5} = \frac{-2}{-9} = \frac{2}{9}, f(-2) = 0, f(0) = \frac{-2}{5}, f(2) = \frac{-4}{3}, f(4) = -6$

29.  $f(-4) = \left(\frac{1}{3}\right)^{-4} = 3^4 = 81, f(-2) = 9, f(0) = 1, f(2) = \frac{1}{9}, f(4) = \frac{1}{81}$



31. (a) 26

(b) -18

33. (a)  $f(-1) = -13$

(b)  $f(1) = -1$