

Student: _____
Date: _____

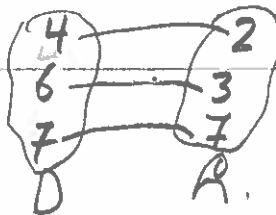
Instructor: Andreas Lazari
Course: Math1111-Summer2018

Assignment: Section 2.1 Homework

1. Determine whether the relation is a function. Give the domain and the range for the relation.

$D \quad R$
 $\{(4,2),(6,3),(7,7)\}$

Is this a function?



For every one value of x
there is only one y .
Yes, it's a function.

No
 Yes

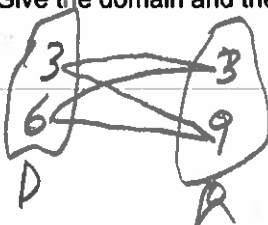
The domain is $\{4, 6, 7\}$.
(Use commas to separate answers.)

The range is $\{2, 3, 7\}$.
(Use commas to separate answers.)

2. Determine whether the relation is a function. Give the domain and the range of the relation.

$\{(3,3),(3,9),(6,3),(6,9)\}$

Is this a function?



For every two values of x
there is one y value.
No, it's not a function.

No
 Yes

The domain is $\{3, 6\}$.
(Use commas to separate answers.)

The range is $\{3, 9\}$.
(Use commas to separate answers.)

3. Determine whether the following equation defines y as a function of x .

$x + y = 5 \Rightarrow y = -x + 5$ Yes, y is a function of x .

Does the equation $x + y = 5$ define y as a function of x ?

Yes
 No

4. Determine whether the following equation defines y as a function of x .

$x^2 + y^2 = 4 \Rightarrow y^2 = 4 - x^2 \Rightarrow y = \pm \sqrt{4 - x^2}$

Does the equation $x^2 + y^2 = 4$ define y as a function of x ?

Yes
 No

For every two values of x
there is one y .
Not a function?

5. Evaluate the function $f(x) = x^2 + 9x + 9$ at the given values of the independent variable and simplify.

- a. $f(-3)$ b. $f(x+3)$ c. $f(-x)$

a. $f(-3) = \underline{-9}$ (Simplify your answer.) $f(-3) = (-3)^2 + 9(-3) + 9 = 9 - 27 + 9 = -9$

b. $f(x+3) = \underline{x^2 + 15x + 45}$ (Simplify your answer.) $f(x+3) = (x+3)^2 + 9(x+3) + 9 = x^2 + 6x + 9 + 9x + 27 + 9 = x^2 + 15x + 45$

c. $f(-x) = \underline{x^2 - 9x + 9}$ (Simplify your answer.) $f(-x) = (-x)^2 + 9(-x) + 9 = x^2 - 9x + 9$

6. Evaluate the function at the given values of the independent variable and simplify.

$$f(x) = \frac{4x^2 - 1}{x^2}$$

- (a) $f(2)$ (b) $f(-2)$ (c) $f(-x)$

(a) $f(2) = \underline{\frac{15}{4}}$ (Type an integer or a fraction. Simplify your answer.) $f(2) = \frac{4(2)^2 - 1}{(2)^2} = \frac{16 - 1}{4} = \frac{15}{4}$

(b) $f(-2) = \underline{\frac{15}{4}}$ (Type an integer or a fraction. Simplify your answer.) $f(-2) = \frac{4(-2)^2 - 1}{(-2)^2} = \frac{16 - 1}{4} = \frac{15}{4}$

(c) $f(-x) = \underline{\frac{4x^2 - 1}{x^2}}$ (Simplify your answer.) $f(-x) = \frac{4(-x)^2 - 1}{(-x)^2} = \frac{4x^2 - 1}{x^2}$

7. Graph the given functions, f and g , in the same rectangular coordinate system. Then describe how the graph of g is related to the graph of f .

$$f(x) = x$$

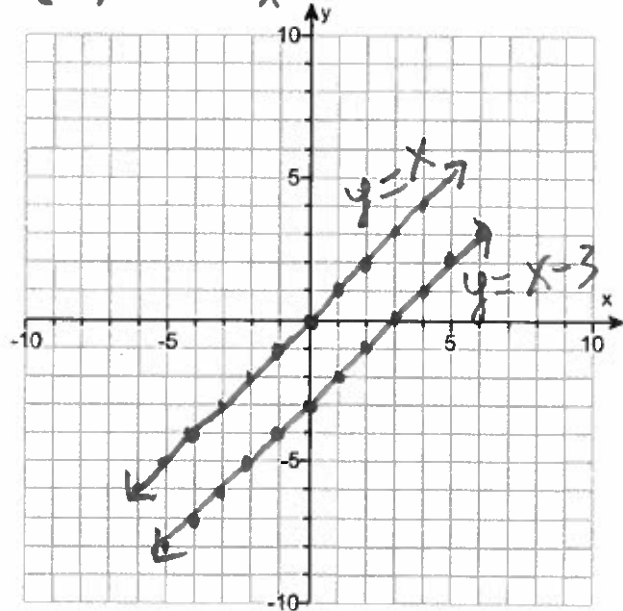
$$g(x) = x - 3$$

Use the graphing tool to graph the functions.

How is the graph of f shifted to get the graph of g ?

The graph of g is the graph of f shifted

(1) down by 3 units.



(1) down up by 3 units.

8. Graph the given functions, f and g , in the same rectangular coordinate system. Describe how the graph of g is related to the graph of f .

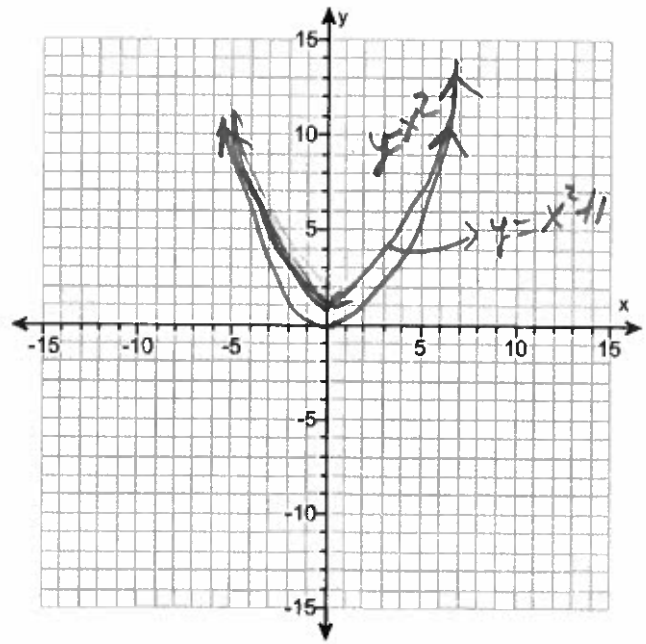
$$f(x) = x^2$$

$$g(x) = x^2 + 1$$

Use the graphing tool to graph the functions.

How is the graph of g related to the graph of f ?

- A. The graph of g is the graph of f shifted 1 units horizontally right.
- B. The graph of g is the graph of f shifted 1 units horizontally left.
- C. The graph of g is the graph of f shifted 1 units vertically down.
- D. The graph of g is the graph of f shifted 1 units vertically up.



9. Graph the given functions, f and g , in the same rectangular coordinate system. Describe how the graph of g is related to the graph of f .

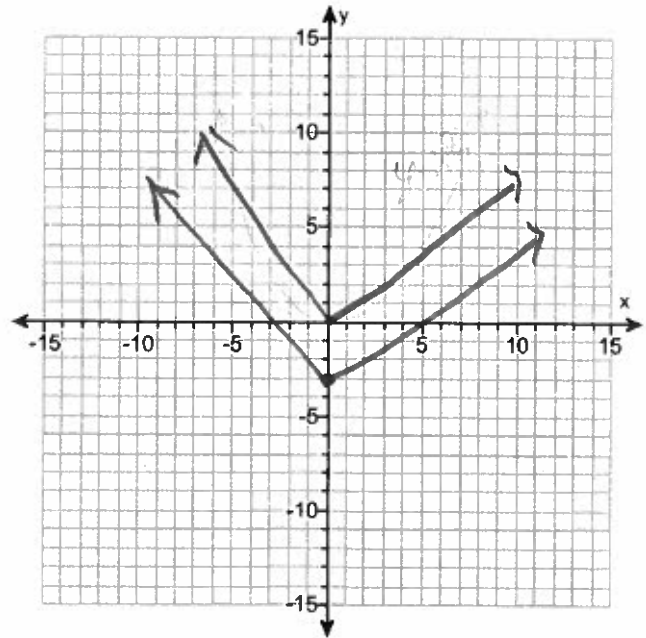
$$f(x) = |x|$$

$$g(x) = |x| - 3$$

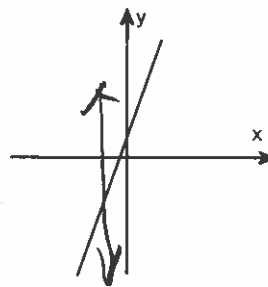
Use the graphing tool to graph the functions.

How is the graph of g related to the graph of f ?

- A. The graph of g is the graph of f shifted 3 units horizontally left.
- B. The graph of g is the graph of f shifted 3 units vertically down.
- C. The graph of g is the graph of f shifted 3 units vertically up.
- D. The graph of g is the graph of f shifted 3 units horizontally right.



10. Use the vertical line test to determine if y is a function of x in the graph.



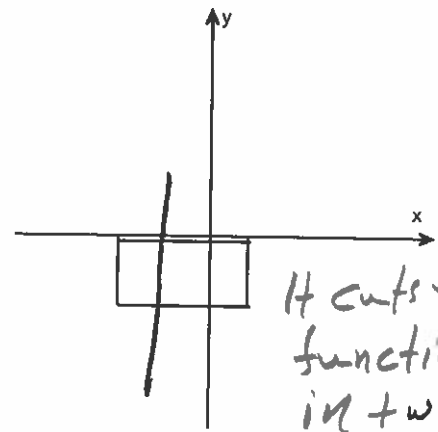
Any vertical line cuts the function in one place only.
Yes, y is a function of x .

- y is a function of x
- y is not a function of x

11. Use the vertical line test to identify graphs in which y is a function of x .

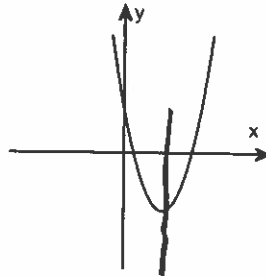
Which of the following statements is correct?

- y is not a function of x
 y is a function of x



It cuts the function in two places.
No, it's not a function

12. Use the vertical line test to determine if y is a function of x in the graph.

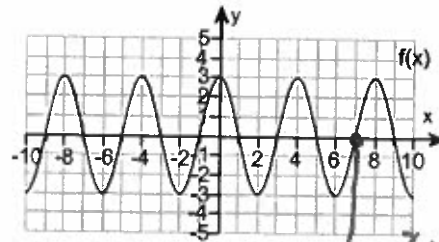


Which of the following statements is correct? Choose the correct answer below.

- y is not a function of x
 y is a function of x

13. Use the graph of f to find the value of $f(7)$.

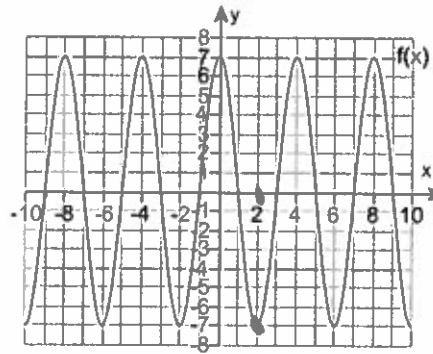
$f(7) =$ 0



(x, y)
 $f(x) = 0$
 $f(x) = y$

14. Use the graph of f to find the value of $f(2)$.

$f(2) = \underline{-7}$

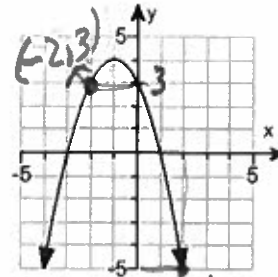


$(2, -7) \Rightarrow f(2) = -7$

15. Use the graph to determine a. the function's domain; b. the function's range; c. the x-intercepts, if any; d. the y-intercept, if any; and e. the missing function values, indicated by question marks, below.

$f(-2) = ? \quad f(2) = ?$

$f(-2) = 3$



$(2, -5)$

$f(2) = -5$

a. The domain is $\underline{(-\infty, \infty)}$. (Use interval notation.)

b. The range is $\underline{(-\infty, 4]}$. (Use interval notation.)

c. Select the correct choice below and fill in any answer boxes within your choice.

A. The x-intercept(s) is (are) $\underline{-3, 1}$.
(Type an integer. Use a comma to separate answers as needed.)

B. There is no x-intercept.

d. Select the correct choice below and fill in any answer boxes within your choice.

A. The y-intercept is $\underline{3}$. (Type an integer.)

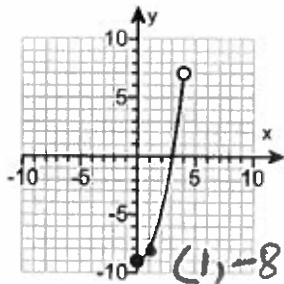
B. There is no y-intercept.

e. $f(-2) = \underline{3}$
 $f(2) = \underline{-5}$

16. Use the graph to determine the following.

- the function's domain
- the function's range
- the x-intercepts, if any
- the y-intercept, if any
- the function value indicated below.

$f(1)$



Domain: $[0, 4)$
Range: $[-9, 7)$

$(1, -8)$
 $f(1) = -8$

a. What is the function's domain?

$[0, 4)$ (Type your answer in interval notation.)

b. What is the function's range?

$[-9, 7)$ (Type your answer in interval notation.)

c. Enter the x-intercept(s). Select the correct choice below and fill in any answer boxes within your choice.

A. The x-intercept(s) is(are) 3.1.
(Type an integer. Use a comma to separate answers as needed.)

B. There is no x-intercept.

d. Enter the y-intercept(s). Select the correct choice below and fill in any answer boxes within your choice.

A. The y-intercept is -9. (Type an integer.)

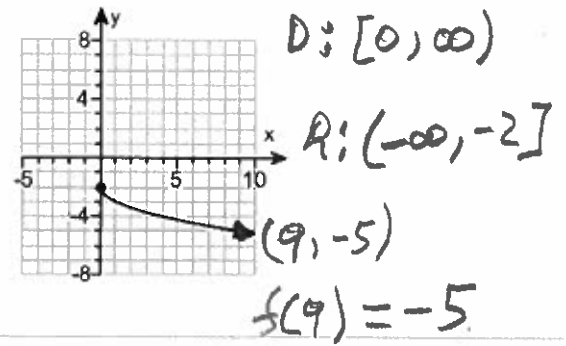
B. There is no y-intercept.

e. Find the value of the function.

$f(1) =$ -8

17. Use the graph to determine a. the function's domain; b. the function's range; c. the x-intercepts, if any; d. the y-intercept, if any; and e. the missing function value, indicated by the question mark, below.

$f(9) = ?$



a. The domain of the function is $[0, \infty)$. (Type your answer in interval notation.)

b. The range of the function is $(-\infty, -2]$. (Type your answer in interval notation.)

c. Determine the x-intercept, if any. Select the correct choice below and fill in any answer boxes within your choice.

A. The x-intercept(s) is (are) _____.
(Type an integer. Use a comma to separate answers as needed.)

B. There is no x-intercept.

d. Determine the y-intercept, if any. Select the correct choice below and fill in any answer boxes within your choice.

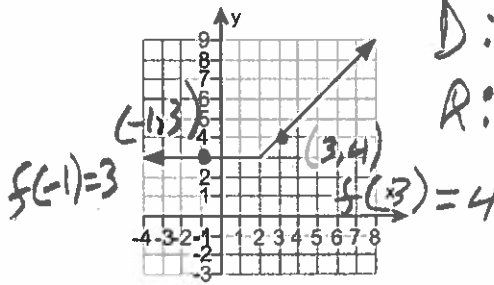
A. The y-intercept is -2 . (Type an integer.)

B. There is no y-intercept.

e. $f(9) =$ -5

18. Use the graph to determine a. the function's domain; b. the function's range; c. the x-intercept, if any; d. the y-intercepts, if any; e. the function values indicated below.

$f(-1)$
 $f(3)$



a. What is the domain?

$(-\infty, \infty)$ (Type your answer in interval notation.)

b. What is the range?

$[3, \infty)$ (Type your answer in interval notation.)

c. Enter the x-intercept(s). Select the correct choice below and fill in any answer boxes within your choice.

A.

(Type an integer. Use a comma to separate answers as needed.)

B. There is no x-intercept.

d. Enter the y-intercept(s). Select the correct choice below and fill in any answer boxes within your choice.

A.

3
(Type an integer. Use a comma to separate answers as needed.)

B. There is no y-intercept.

e. What are the values of the function?

$f(-1) = \underline{3}$
 $f(3) = \underline{4}$

1. Yes

4,6,7

2,3,7

2. No

3,6

3,9

3. Yes

4. No

5. -9

$$x^2 + 15x + 45$$

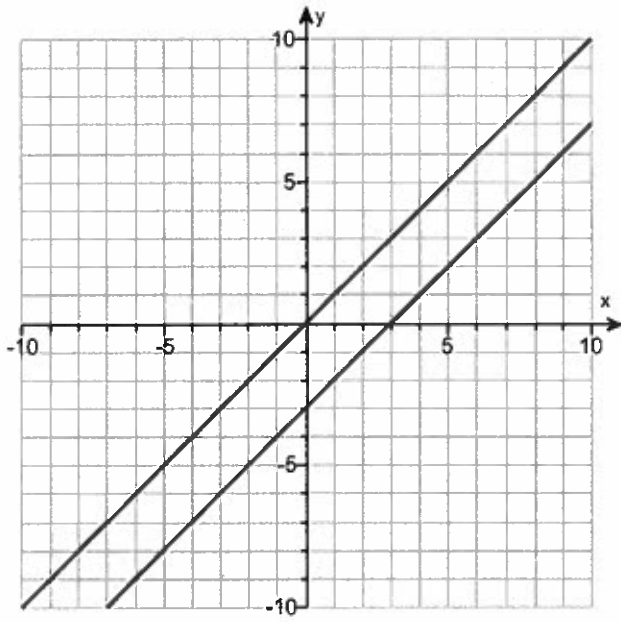
$$x^2 - 9x + 9$$

6. $\frac{15}{4}$

$$\frac{15}{4}$$

$$\frac{4x^2 - 1}{x^2}$$

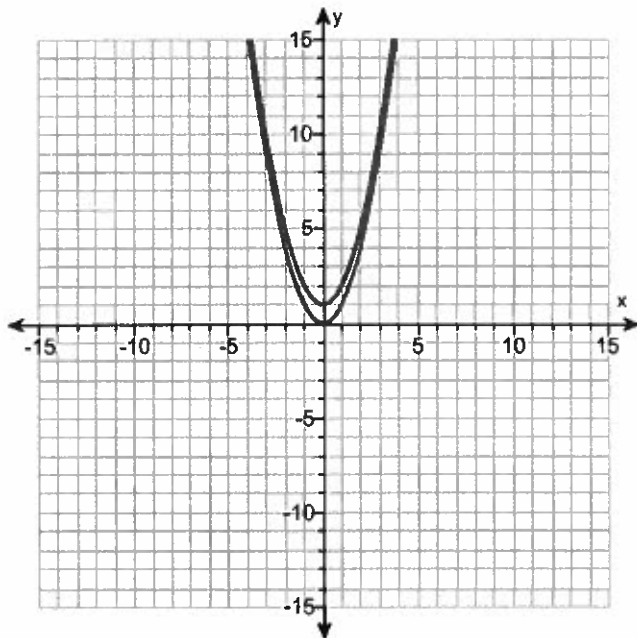
7.



(1) down

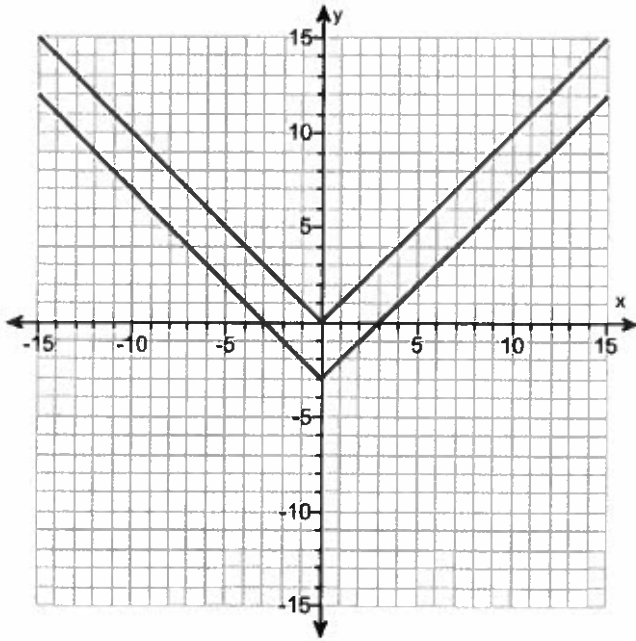
3

8.



D. The graph of g is the graph of f shifted 1 units vertically up.

9.



B. The graph of g is the graph of f shifted 3 units vertically down.

10. y is a function of x

11. y is not a function of x

12. y is a function of x

13. 0

14. -7

15. $(-\infty, \infty)$

$(-\infty, 4]$

A. The x-intercept(s) is (are) -3, 1. (Type an integer. Use a comma to separate answers as needed.)

A. The y-intercept is 3. (Type an integer.)

3

-5

16. $[0,4)$

$[-9,7)$

A. The x-intercept(s) is(are) 3. (Type an integer. Use a comma to separate answers as needed.)

A. The y-intercept is -9. (Type an integer.)

-8

17. $[0,\infty)$

$(-\infty, -2]$

B. There is no x-intercept.

A. The y-intercept is -2. (Type an integer.)

-5

18. $(-\infty,\infty)$

$[3,\infty)$

B. There is no x-intercept.

A. 3 (Type an integer. Use a comma to separate answers as needed.)

3

4
