Algebra 1 Workbook

Functions

krista king MATH

DOMAIN AND RANGE

1. Find the domain of $f(x)$.

$$f(x) = \frac{3}{x(x+1)} + x^2$$

2. Find the domain and range of the given set.

$$(-1,-3), \quad (0,5), \quad (-3,6), \quad (0,-3)$$

3. Find the domain and range of $g(x)$.

$$g(x) = \frac{\sqrt{x-2}}{3}$$

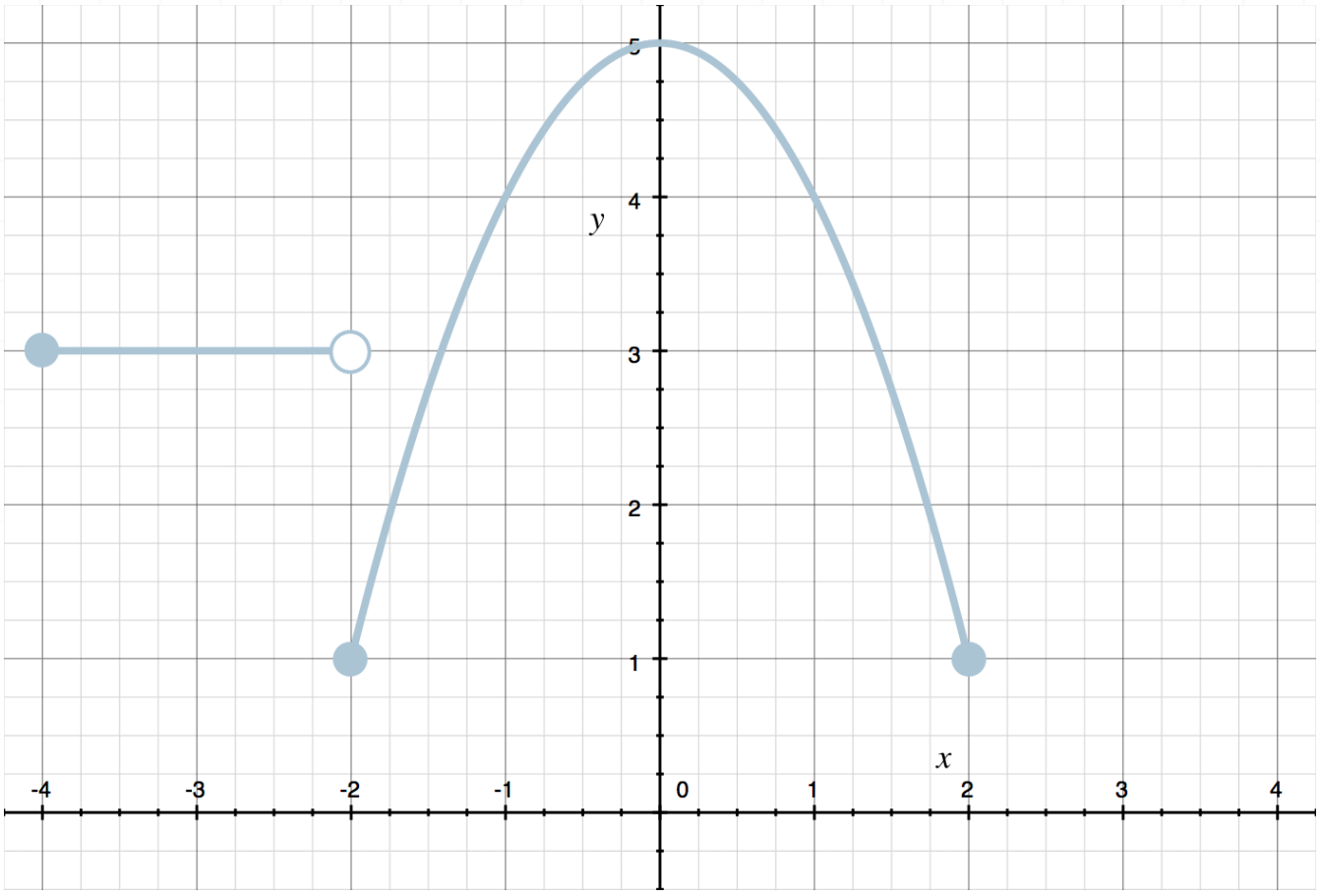
4. Find the domain and range of the function.

$$f(x) = \frac{2}{x} + 1$$

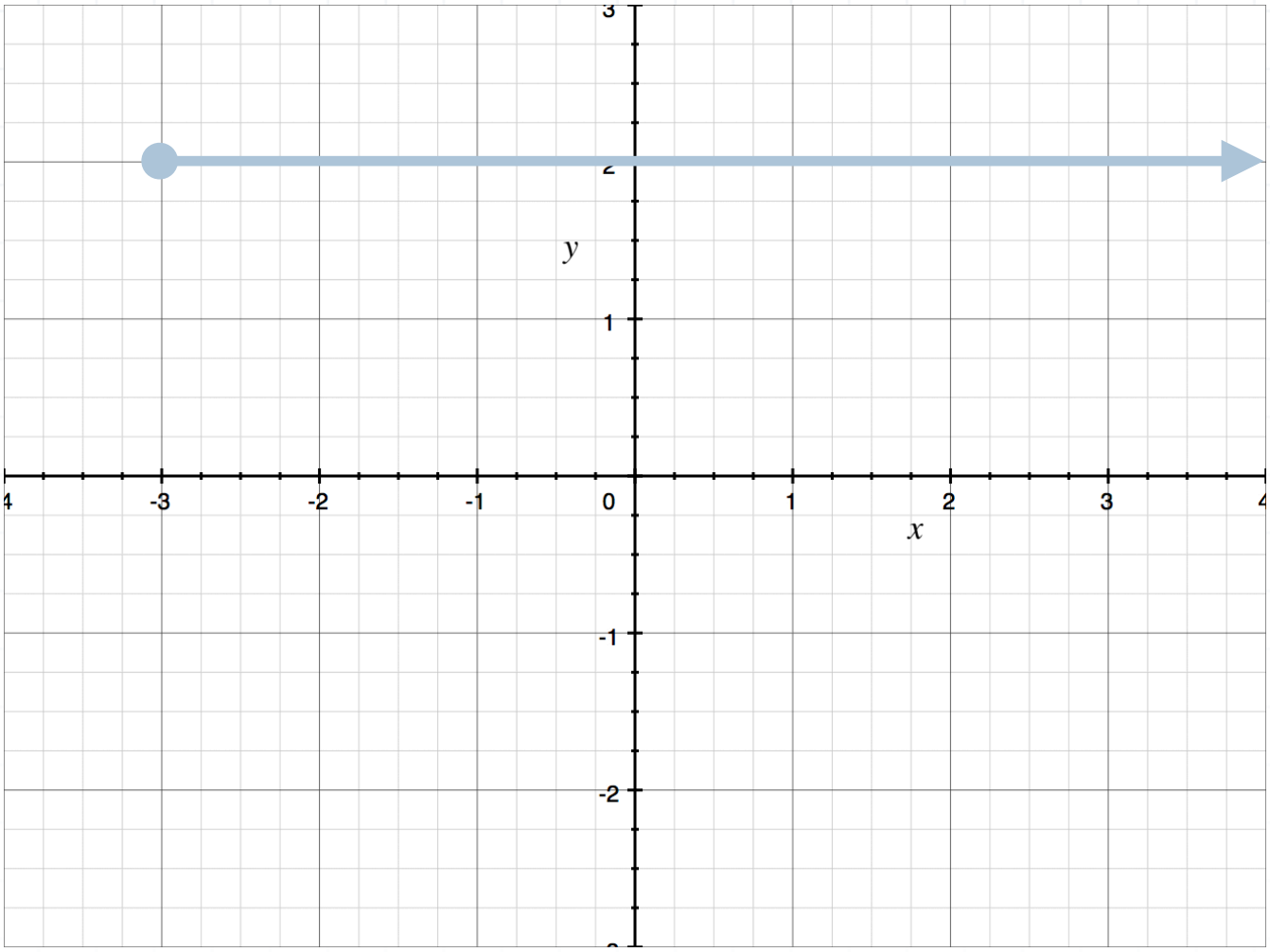
5. Give an example of a function that has a domain of $[1,\infty)$.

DOMAIN AND RANGE FROM A GRAPH

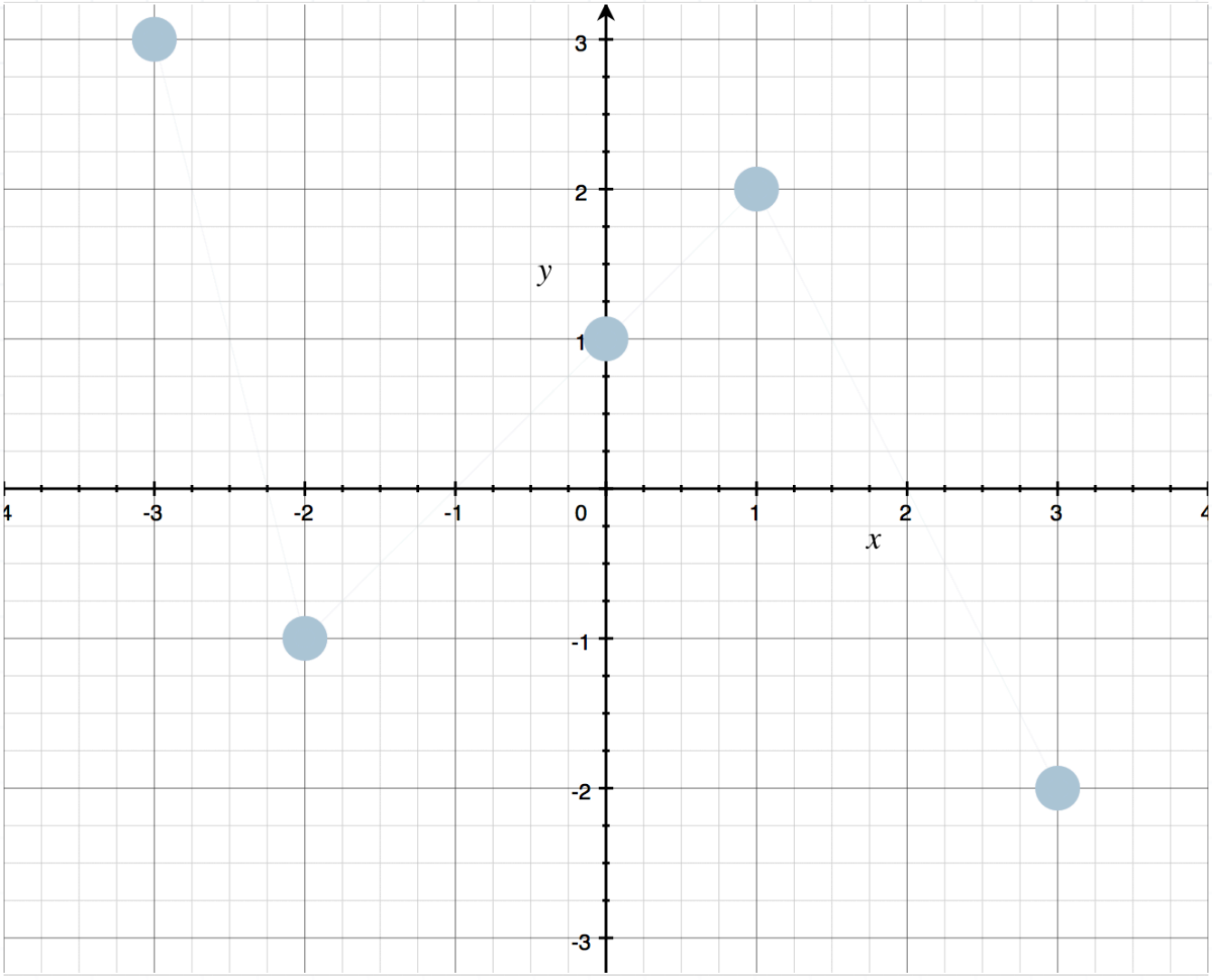
1. What is the domain and range of the function? Assume the graph does not extend beyond the graph shown.



2. What is the domain and range of the function?



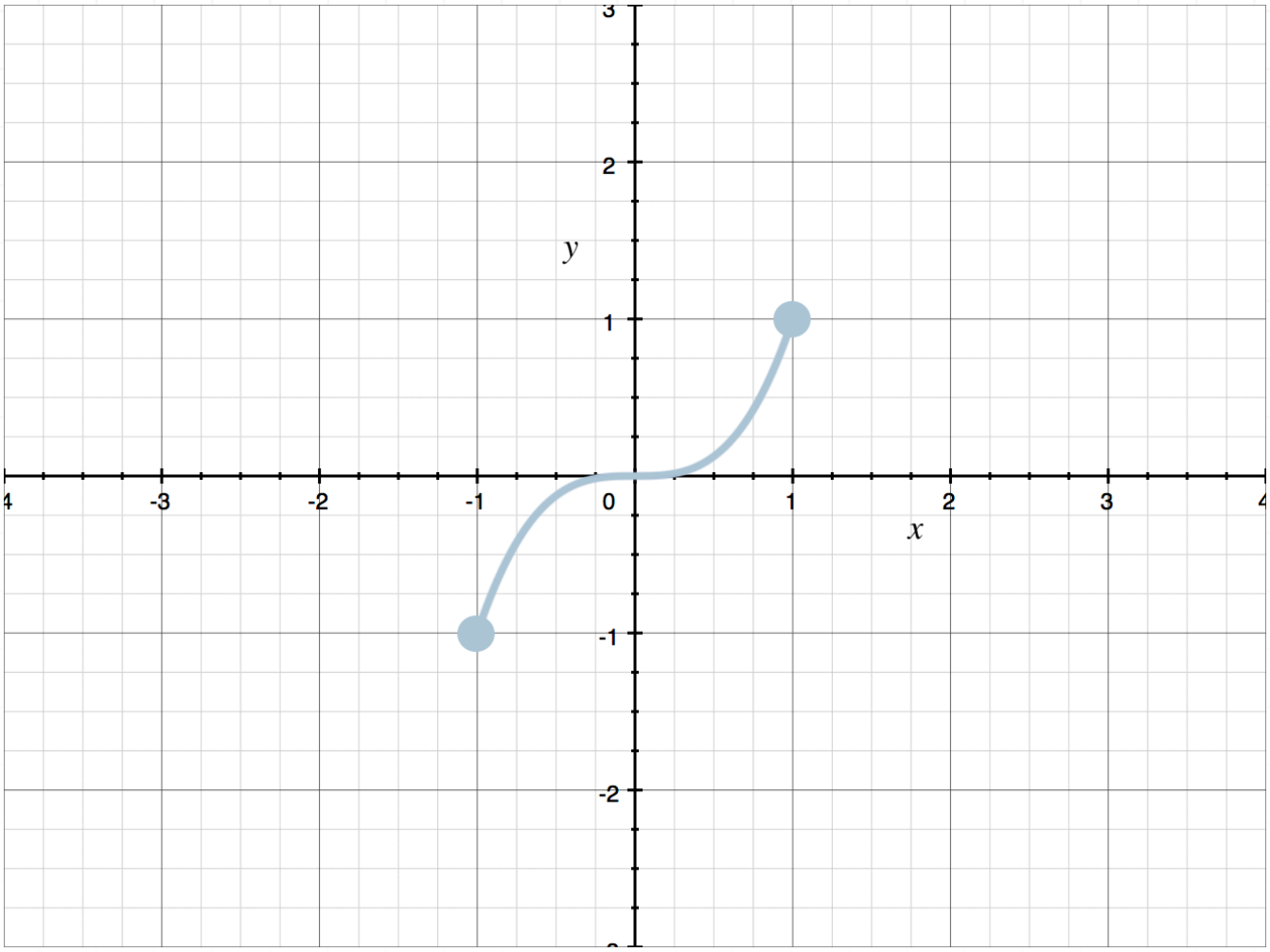
3. Determine the domain and range of the function.



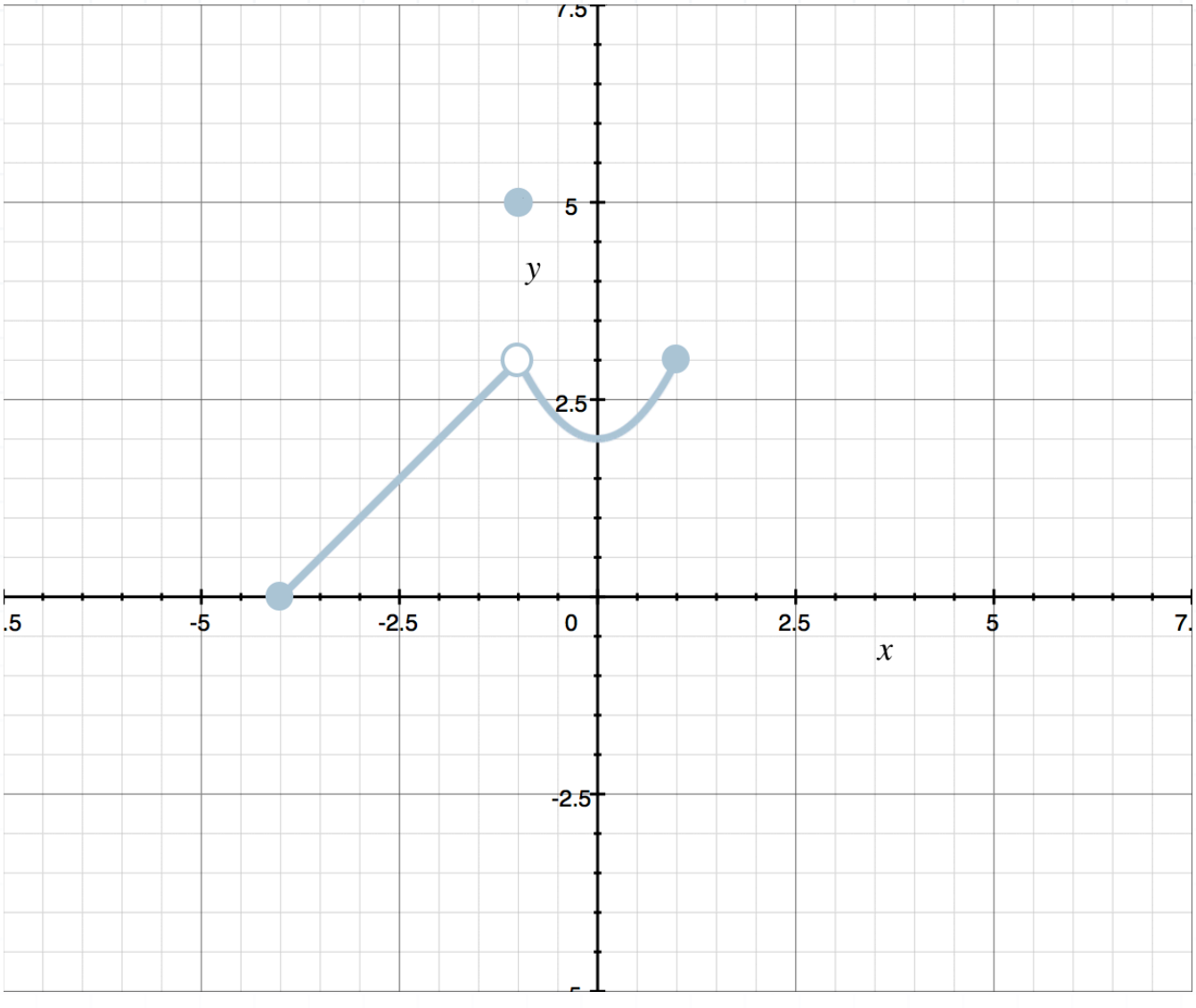
4. Fill in the blanks in the following description of the domain of a graph.

"The domain is all the values of the graph from _____ to _____."

5. What is the domain and range of the function? Assume the graph does not extend beyond the graph shown.



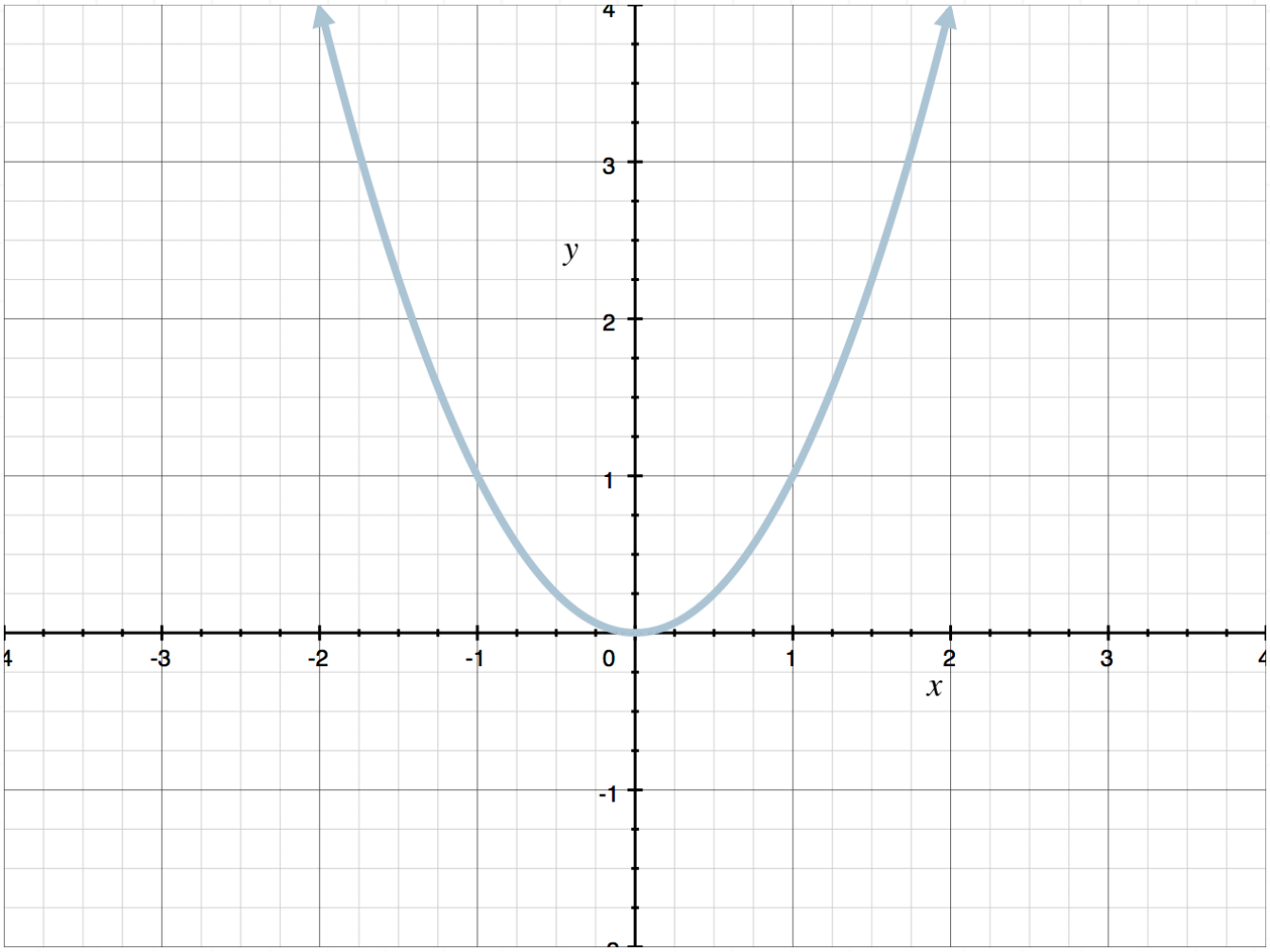
6. What is the domain and range of the function? Assume the graph does not extend beyond the graph shown.



7. Fill in the blanks in the following description of the range of a graph.

"The range is all the values of the graph from _____ to _____."

8. What is the domain and range of the function?



FUNCTIONAL NOTATION

1. If $f(x) = 11 - 5x$, find $f(-2)$.

2. Find and simplify $f(x + 1)$ if $f(x) = 4x - 5$.

3. Correct what went wrong in the following set of steps.

At $x = -2$ and $f(x) = x^2 + 1$, then

$f(-2) = -2^2 + 1$

$f(-2) = -4 + 1$

$f(-2) = -3$

4. If $g(t) = t^2 - t + 3$, find $g(-1)$.

5. Find and simplify $h(s^2)$ if $h(s) = -s^2 + 3s - 1$.

6. If $g(x) = x^3 - x + 1$, figure out what you need to plug into the function in order to get the following expression.

$g(??) = (2x+1)^3 - (2x+1) + 1$

7. If $f(x) = x^2 + x - 1$, find $f(x+h)$ and expand as much as possible.

8. Correct what went wrong in the following set of steps.

If $f(x) = x^3 + 3x^2 - 5x + 2$, then $f(1)$ is

$f(1) = (1)^3 + 3(1)^2 - 5(1) + 2$

$f(1) = 1 + 9 - 5 + 2$

$f(1) = 7$

TESTING FOR FUNCTIONS

1. Determine if the following represents a function. Explain your answer.

$(2, -1), (-1,0), (0, -1), (3,2)$

2. Draw a graph that represents a function. Explain why it's a function.

3. Fill in the blanks in the following definition of a function.

For every _____, there is only one unique _____.

4. Give two different y-values that have the same output value for x.

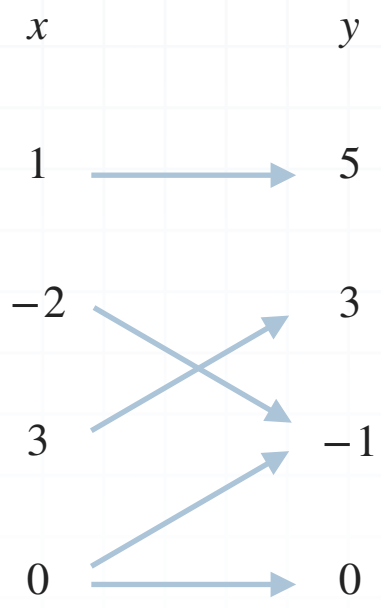
$y^2 = x$

5. Draw a graph that does not represent a function. Explain why it's not a function.

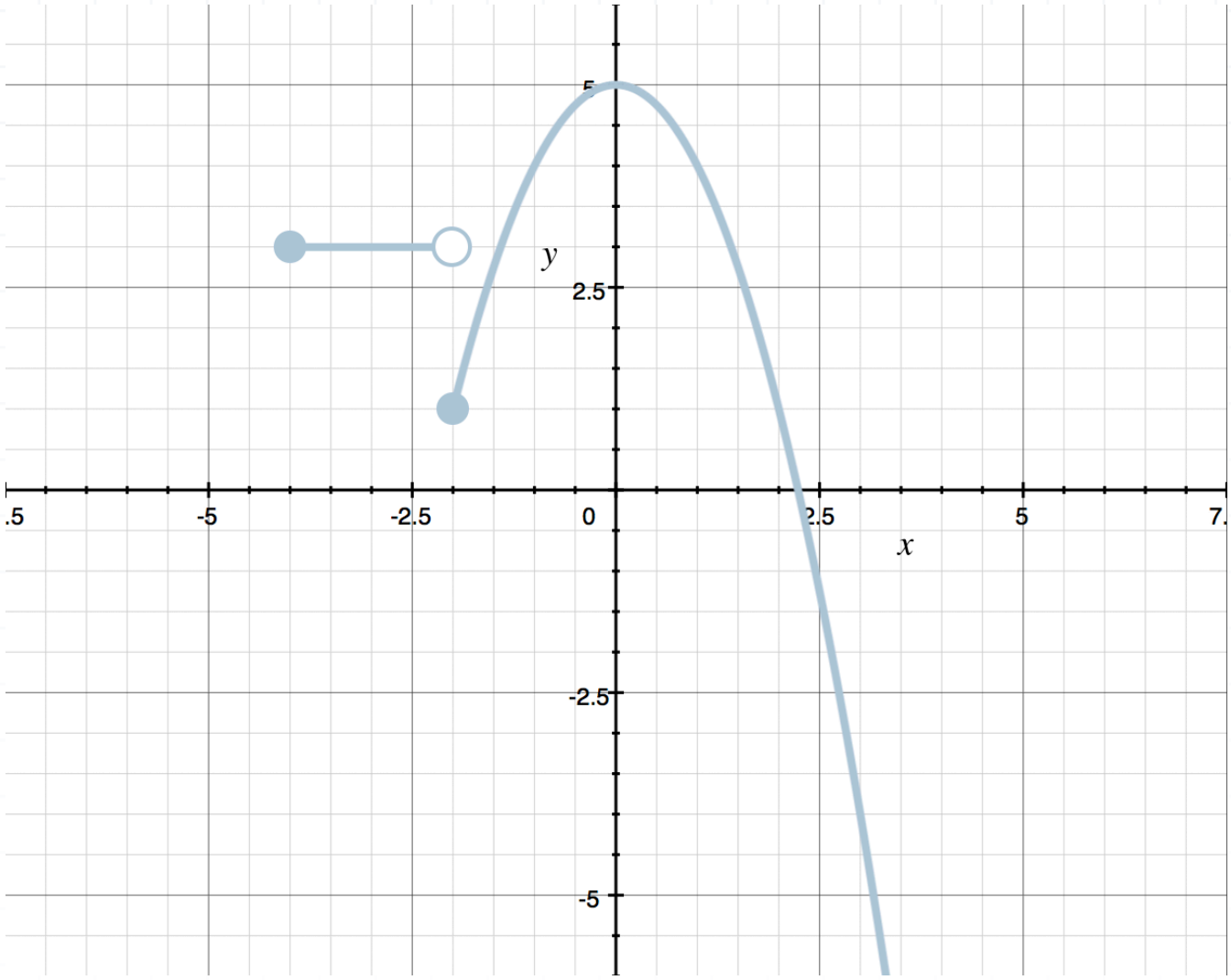
6. Determine whether or not the following set of points represents a function. Explain your answer.

$(1,2),\ (-1,5),\ (1,-3),\ (0,1)$

7. Determine if the following represents a function. Explain your answer.



8. Determine if the following represents a function. Explain your answer.



VERTICAL LINE TEST

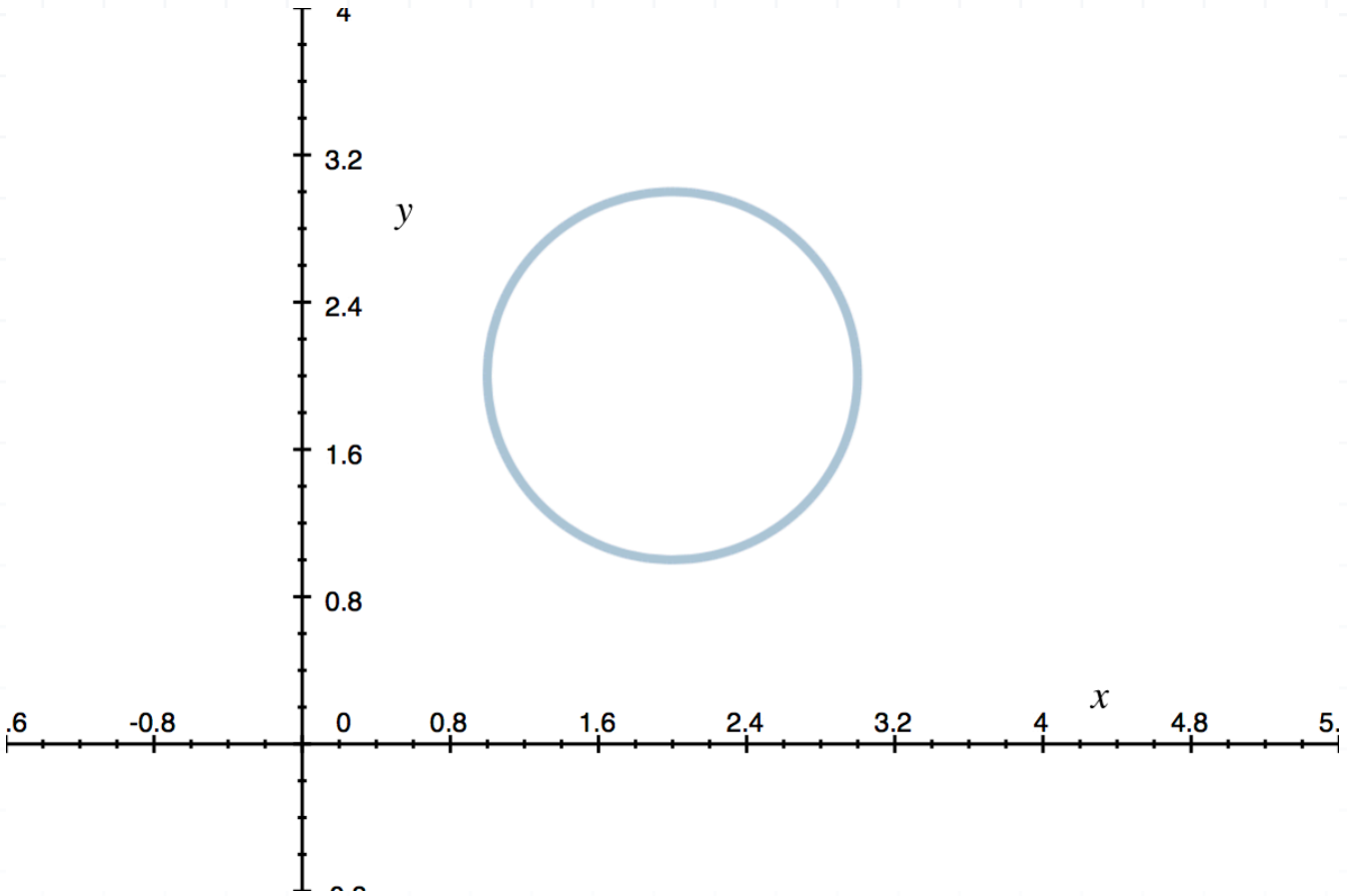
1. Determine algebraically whether or not the equation represents a function.

$$(x-1)^2+y=3$$

2. Fill in the blanks in the following statement using “equations,” and “functions.”

All _____ are _____.

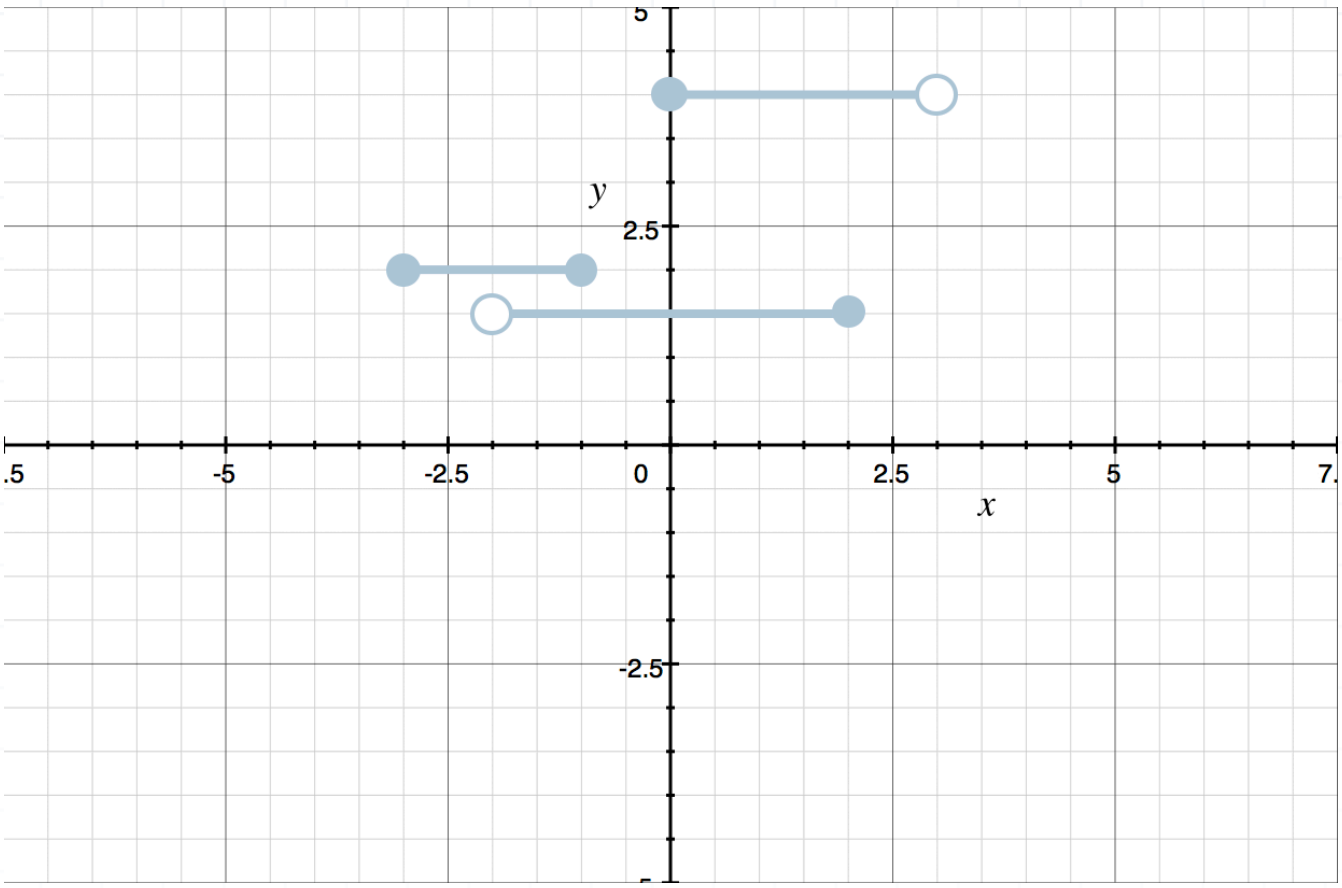
3. Use the Vertical Line Test to determine whether or not the graph is the graph of a function.



4. Determine algebraically whether or not the equation represents a function.

$$y^2 = x + 1$$

5. Use the Vertical Line Test to determine whether or not the graph represents a function.



6. Explain why the Vertical Line Test determines whether or not a graph represents a function.

7. Fill in the blanks in the following statement using: equations, functions.

Not all _____ are _____.

8. Determine algebraically whether or not the equation represents a function.

$$x^3 + y = 5$$

SUM OF FUNCTIONS

1. Find $(f+h)(-1)$ if $f(x)=x^2+1$ and $h(x)=2x-2$.

2. Find and simplify $(h+g)(x)$ if $g(x)=x^2+3x-1$ and $h(x)=-2x^2+4x-5$.

3. If $f(-2)=6$, $g(-2)=-3$, and $h(-2)=4$, find $(f+g+h)(-2)$.

4. Describe two ways you can add two functions together.

5. Find $(h+g)(t)$ if $h(t)=4t^2-3$ and $g(t)=-3t^2+4$.

6. Given the expression below, determine $f(x)$ and $g(x)$.

$$(f+g)(x)=(-x^2+3x+2)+(x-7)$$

7. Let $a(x)=x^3-x^2+x-1$ and $b(x)=-x^3+x^2+x-1$. Determine the value of $(a+b)(-1)$.

8. What went wrong in the following set of steps?

$(x^2 + x - 9) + (x - 1)$

$(3x - 9) + (x - 1)$

$3x - 9 + x - 1$

$4x - 10$

9. If $g(1) = 5$ and $h(1) = -3$, find $(g + h)(1)$.

10. If $f(0) = 3$ and $(f + g)(0) = 8$, find $g(0)$.

PRODUCT OF FUNCTIONS

1. Find and simplify $(ab)(x)$ if $a(x) = x + 3$ and $b(x) = 5x - 4$.

2. Find $(fg)(-1)$ if $f(x) = x^2 + 3$ and $g(x) = x - 5$.

3. If $g(0) = -2$ and $(gh)(0) = -14$, find $h(0)$.

4. What went wrong in the following set of steps?

$(x + 1)(x + 2)$

$x \cdot x + 2 \cdot x + 2$

5. Given the expanded expression below, determine $f(x)$ and $g(x)$.

$(gf)(x) = x^2(x - 7) - x(x - 7) + 5(x - 7)$

6. Find $(fh)(5)$ if $f(x) = -x^2 + 2x$ and $h(x) = 2x + 7$.

7. Describe two different ways that you can multiply two functions together and evaluate the product at a particular point.

8. Find and simplify $(gh)(x)$ if $g(x) = x^2 + 1$ and $h(x) = 2x^2 + 3$.

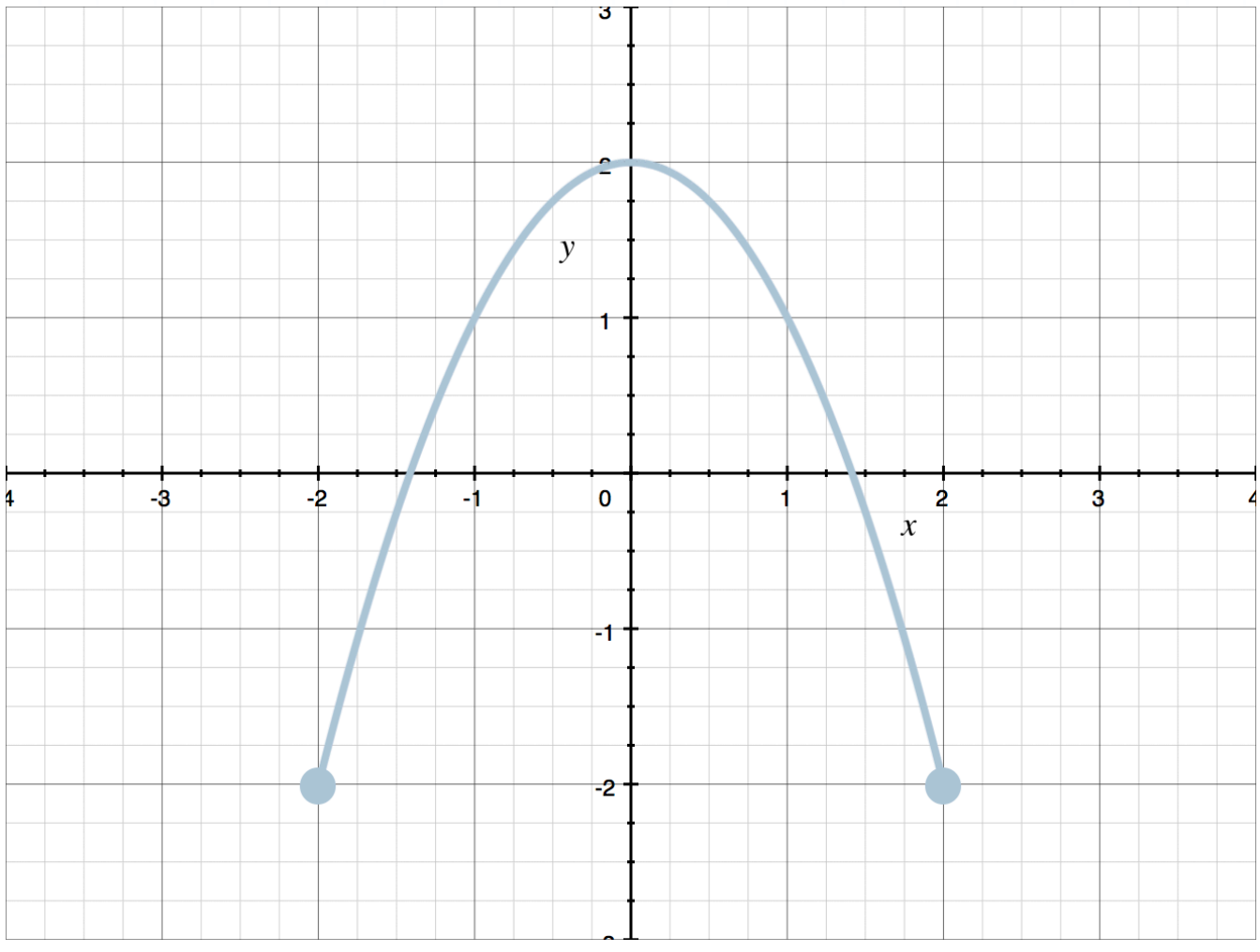
EVEN, ODD, OR NEITHER

1. Is the function even, odd, or neither?

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

2. Describe the symmetry of an even function, and give an example of an even function.

3. Determine if the graph is the graph of a function that is even, odd, or neither.



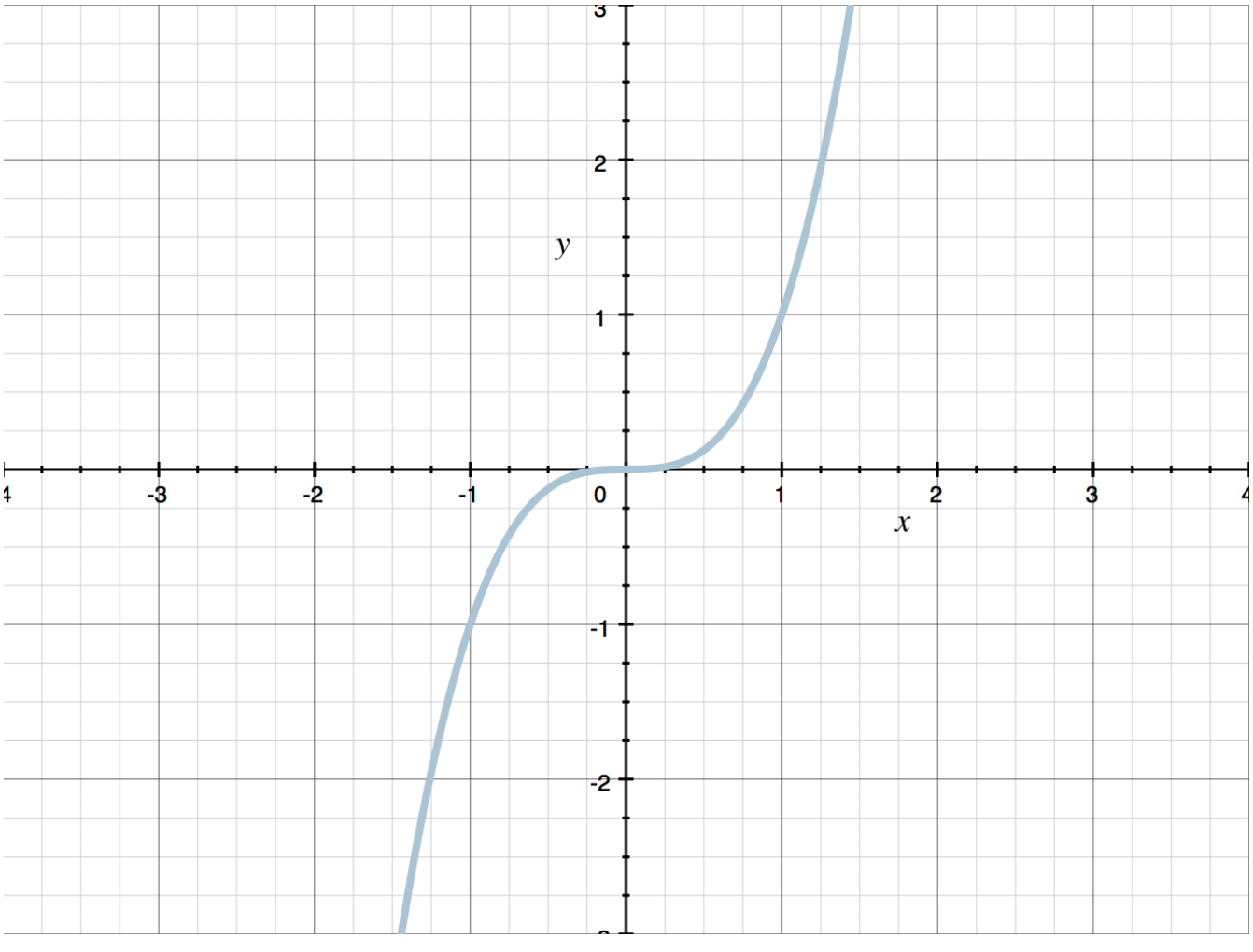
4. Is the function even, odd, or neither?

$$g(x) = -3x^2 + 5x^6$$

5. Show that the function is neither even nor odd.

$$f(x) = x^2 - 5x + 7$$

6. Determine if the graph is the graph of a function that is even, odd, or neither.



7. Is the function even, odd, or neither?

$$h(x) = x^3 - 3x$$

8. Describe the symmetry of an odd function, and give an example of an odd function.

INDEPENDENT AND DEPENDENT VARIABLES

1. In the following function, determine which variable is the independent variable and which is the dependent variable.

$$2y + 2 - x^2 = 3x^2 - 5 + y$$

2. Sarah drives at a constant speed of 30 mph. The time she drives is given by $h = d/30$, where d denotes the distance and h denotes the total number of hours she drove. Which variable is the independent variable? Explain your answer.

3. Give a definition for “independent variable” and give an example of an equation in which k is the independent variable.

4. Give an example of a function with independent variable t and dependent variable s.

5. Identify the independent variable(s) and dependent variable(s) in the following function.

$$x = a - b^2$$

6. You open a bag of chips and eat 11 of them. Let a be the number of chips remaining and b be the number of chips in the bag before you ate any. Identify the dependent and independent variables in the relationship between a and b.

7. You're buying candy bars and soda from the store. Each candy bar costs $\$1$, and each soda costs $\$2$. What is the dependent variable?

8. Each month, a cell phone bill is calculated using the total number of minutes used and the total number of text messages sent during that month. Which variable(s) is/are the independent variable(s)?

9. You make your bed and sweep the floor to earn some money around the house. Each time you make your bed, you earn $\$5$. Each time you sweep the floor, you earn $\$3$. What is/are the independent variable(s)?

10. Give a definition for "dependent variable" and an example of a function in which s is a dependent variable.

11. Identify the independent variable(s) and dependent variable(s) in the following function.

$$T + 5 = 3x + y^2 - 4xy$$


FOR THE LOVE OF MATH