

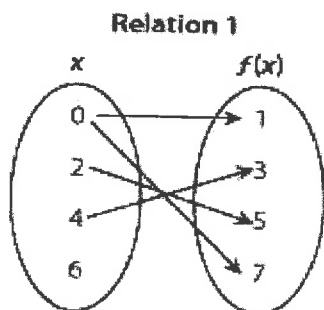
Answer Key

## Chapter 1: Functions

## FIFA1

Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If  $f$  is a function and  $x$  is an element of its domain, then  $f(x)$  denotes the output of  $f$  corresponding to the input  $x$ . The graph of  $f$  is the graph of the equation  $y = f(x)$ .

Four relations are show below.



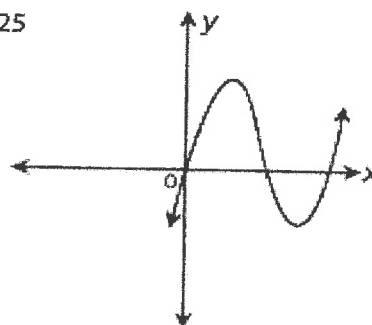
Relation 2

x	y
-2	5
-1	2
0	1
1	2
2	5

Relation 3

$$x^2 + y^2 = 25$$

Relation 4



Determine which of these relations are functions. Cite your reasoning in the space below.

Relation 1 is not a function since the input 0 has two outputs.  
is / is not

Relation 2 is a function since all inputs have only one output.  
is / is not

Relation 3 is not a function since when graphed, ~~the curve is a circle~~ certain inputs have two outputs

Relation 4 is a function since each input has only one output  
(you may also cite the "vertical line test")

## Chapter 1: Functions

**FIFA2**

Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

**Example 1**

Use the function below to answer the questions.

$$f(x) = -\frac{2}{5}x + 3$$

A. What is  $f(-4)$ ? Show your work.

$$\begin{aligned} f(-4) &= -\frac{2}{5}(-4) + 3 \\ &= \frac{8}{5} + 3 = \frac{8}{5} + \frac{15}{5} = \frac{23}{5} \text{ or } 4.6 \end{aligned}$$

B. What is the value of  $x$  when  $f(x) = 0$ ? Show your work.

$$\begin{aligned} 0 &= -\frac{2}{5}x + 3 \\ -3 & \qquad \qquad -3 \end{aligned}$$

$$-3 = -\frac{2}{5}x$$

$-\frac{2}{5}$  times what number is  $-3$ ?

$$-3 = -0.4x$$

$$0.75 = x$$

**Example 2**

This function can be used to determine the number of bacteria in a culture  $h$  hours after the culture was started.

$$f(h) = 10(3)^h$$

Which statement best describes the meaning of the equation  $f(2) = 90$ ?

- A It gives the number of bacteria in the culture after 2 hours.
- B It gives the number of bacteria in the culture after 3 hours.
- C It gives the number of bacteria in the culture after 45 hours.
- D It gives the number of bacteria in the culture after 90 hours.

2 was substituted for  $h$ , which represented hours.

## Chapter 1: Functions

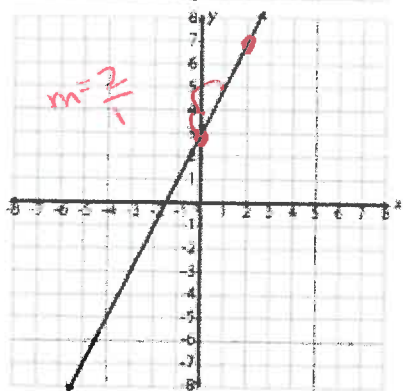
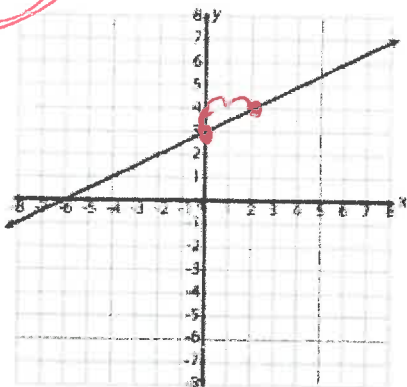
## AREID10

Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

Which of the following shows the graph of  $y = \frac{1}{2}x + 3$  ?

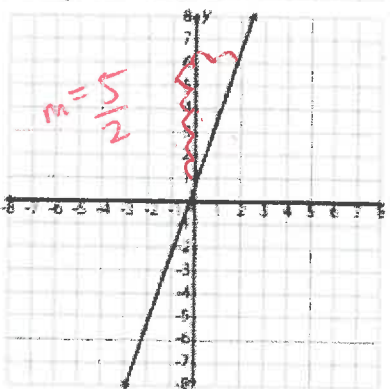
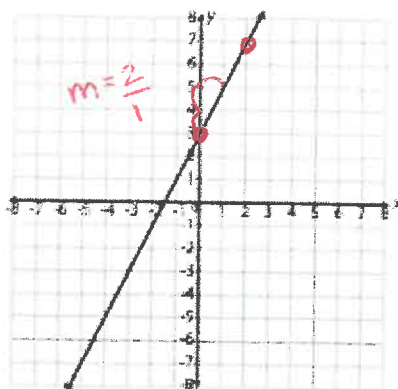
Show your work and explain your reasoning in the space below.

**A**



**C**

**B**



**D**

When  $x=0$   
 $y = \frac{1}{2}(0) + 3$   
 $y = 3$

When  $x=2$   
 $y = \frac{1}{2}(2) + 3$   
 $y = 1 + 3$   
 $y = 4$

The graph of  $y = \frac{1}{2}x + 3$  is graph A since when

I evaluated the function at  $x=0$  and  $x=2$ , the  $y$ -values were  $y=3$  and  $y=4$  and graph A contains the points  $(0, 3)$  and  $(2, 4)$ .

## Chapter 1: Functions

## FIFC7

Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.\*

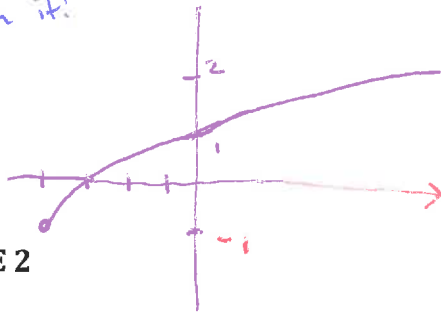
## EXAMPLE 1

Given the function  $y = \sqrt{x+4} - 1$

Identify the coordinate of the  $x$ -intercept. (, 0)

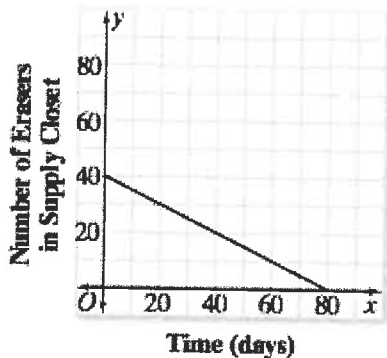
Identify the coordinate of the  $y$ -intercept. (0, )

Graph it!



## EXAMPLE 2

At the beginning of each school year, Principal Sao stocks the teachers' supply closet with new erasers. The graph below shows the change in number of erasers in the supply closet over time. The relationship can be represented by the equation  $y = -\frac{1}{2}x + 40$ .



How long does it take  
for the erasers ~~to~~  
to completely disappear?

The erasers completely disappear after 80 days since at that point, the  $y$ -value is 0.

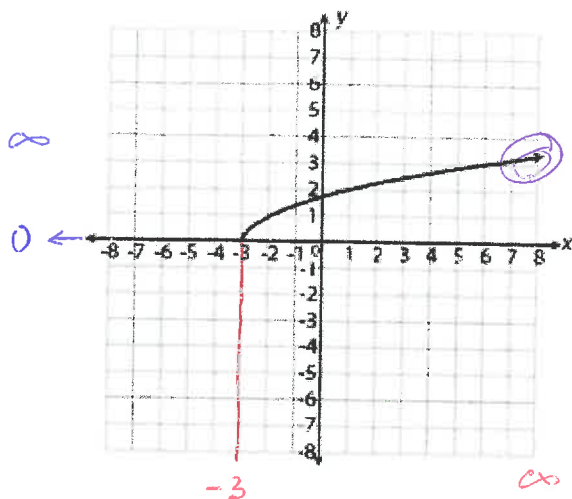
## Chapter 1: Functions

## FIFB5

Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function  $h(n)$  gives the number of person-hours it takes to assemble  $n$  engines in a factory, then the positive integers would be an appropriate domain for the function.\*

## Example 1

What is the domain of the function graphed below?



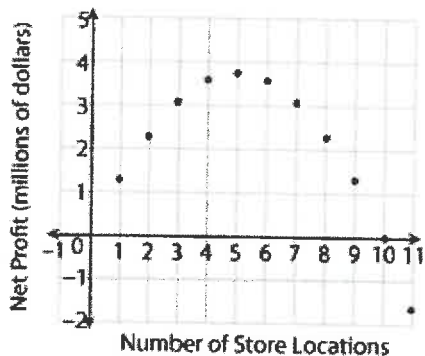
Domain  
 $-3 \leq x < \infty$

Range  
 $0 \leq y < \infty$

## Example 2

What is the range of the function above?

The chief financial officer for an office supply company presents a function to the company president. The function models the number of proposed stores (up to 11) and the projected net profit for the company. The graph for the function is shown.



Domain

$\{1.2, 2.2, 3.1, 3.5, 3.6, 3.5, 3.1, 2.2, 1.2, 0, -1.6\}$

approximations

listed as numbers because they're not connected

What is the domain of the function?