

- A relation is a set of ordered pairs.
- The domain of a relation is the set of x-coordinates.
- The range of a relation is the set of y-coordinates.
- A function is a relation in which, for each x-coordinate there corresponds exactly one y-coordinate.

Note: If a relation is a function, then y is said to be a function of x.

Relations Defined by Sets of Ordered Pairs

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

1. $\{(-2,3), (5,-1), (-2,4)\}$

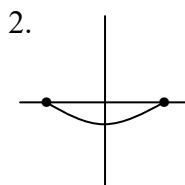
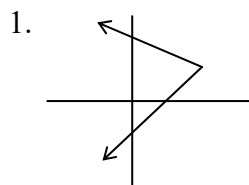
2.

x	y
7	-4
2	2
0	-4

Relations Represented by Graphs

Vertical Line Test: If there is a vertical line that crosses the graph of a relation at more than one point, then the graph does not represent a function. Otherwise, the graph does represent a function.

Determine whether the relation graphed is a function.



Determining Whether a Relation Defined by an Equation Is a Function

Determine whether the relation defines y as a function of x.

1. $y = x^4$

2. $y^2 = x + 1$

3. $x^2 + 3xy = 12$

4. $2y + 5 = |x|$

Function Notation

The symbol $f(x)$ denotes the particular value of y corresponding to a value of x . In other words, $f(x)$ is synonymous with y . When the symbol $f(x)$ is used, then the name of the function is f .

1. Let $f(x) = -x^2 - 3x + 2$. Find each of the following.

a. $f(3)$

b. $f(-4a)$

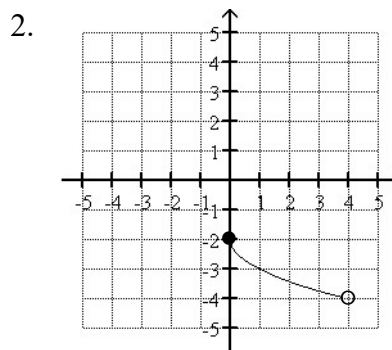
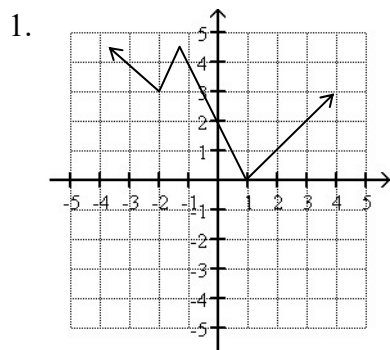
c. $f(x - 2)$

Obtaining Information from Graphs

Use the graph of each function, $y = f(x)$, to find the following.

(a) the domain (b) the range (c) the x -intercepts, if any (d) the y -intercepts, if any

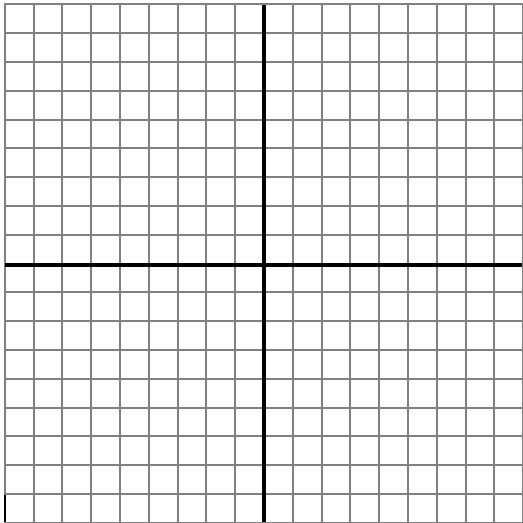
(e) $f(1)$ (f) the values of x , if any, for which $f(x) = 2$



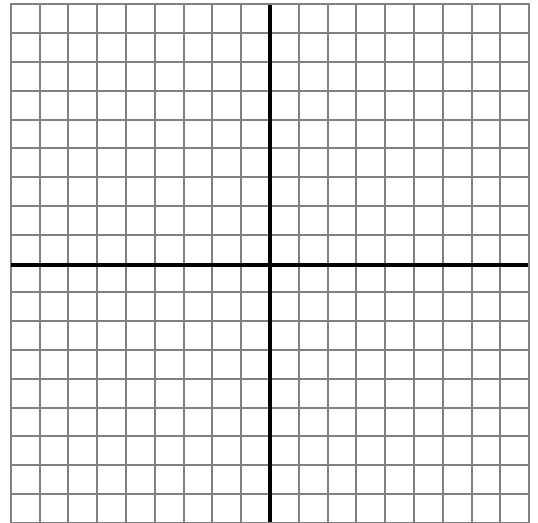
Graphing Equations by Point Plotting

Important: Point plotting is not really a technique for graphing. However, when used with the techniques of graphing you will learn later on in the course, it can be helpful. The purpose of point plotting in this section is two-fold. First, you will see that many graphs have shapes that are not straight lines. Second, it can help you see the relationship between 2 graphs.

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

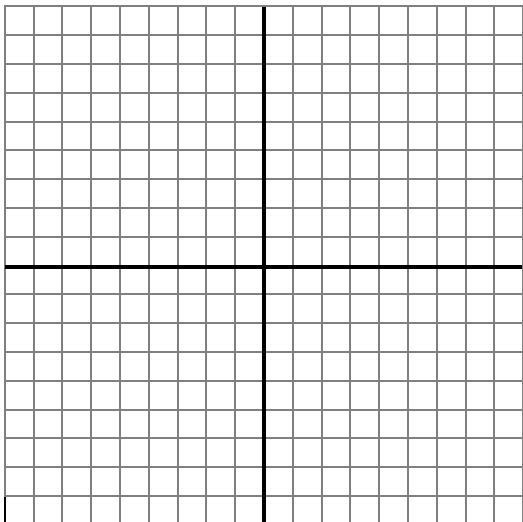


$$g(x) = x^2 - 2$$

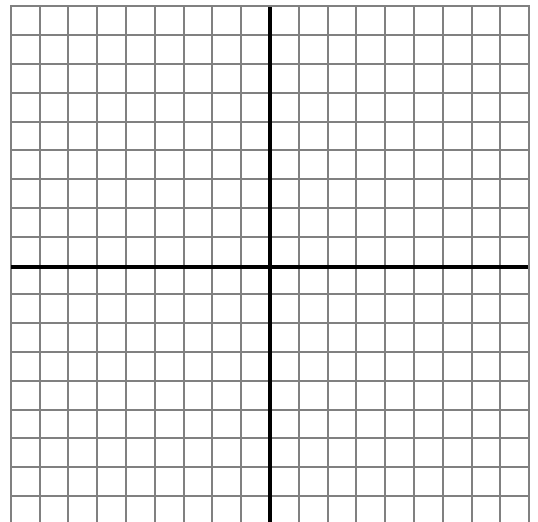


Relationship:

$$f(x) = \sqrt{x} \quad (\text{note: } x \geq 0)$$



$$g(x) = \sqrt{x+2} \quad (\text{note: } x \geq -2)$$



Relationship: