**Definition**:  A **function** is a correspondence between a first set and a second set such that each element in the first set corresponds to exactly one element in the second set.

The first set is called the **domain**.  The second set is called the **range**.

**Notation**:  In the equation $f(x) = 3x - 5$, $x$ represents an arbitrary input and $f(x)$ represents the corresponding output.  This function may be written $y = 3x - 5$, where $x$ is the independent variable and $y$ is the dependent variable.

**Example**:  Given $y$ is a linear function of $x$.  An ordered pair for this function is $(x, y)$.  An
  .   equation for is linear function could be written $y = mx + b$ or $f(x) = mx + b$.

1.  Complete the following:

(a)  Income(**I**) is a linear function of the hours worked(**h**).  An ordered pair for this function is ( __ , __ ).
     An equation for this function is _____ .

(b)  Property taxes(**t**) are a linear function of property value (**v**).  An ordered pair for this function is
     ( __ , __ ) .  An equation for this function is _____ .

2.  In January, Pedro's gas bill for 12 units of gas was $50.00.  In February, his gas bill was $64.00 for 16 units of gas.  Express this relation as a linear function.

3.  A water company charged $16.75 for 9 cubic feet of water.  For 18 cubic feet, it charged $25.75. Express this relation as a linear function.

4.  An assembly plant pays its line workers $7.60 per hour plus $0.85 per item assembled.  Write a linear function for **H**, the hourly wage earned when **n** items are assembled per hour.
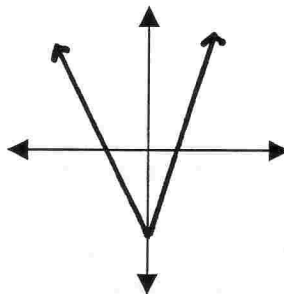
> **Vertical Line Test**: If a vertical line intersects a graph in more than one point, the graph is not the graph of a function.

5. Determine whether each of the following is the graph of a function:
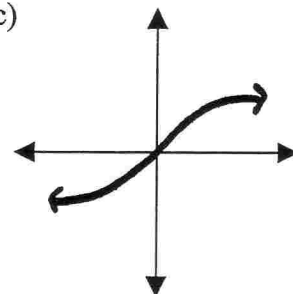
(a)
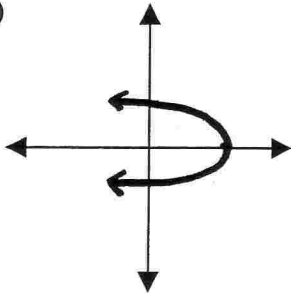
(b)

(c)

6. Find the domain and range of each function:

(a) $f(x) = -x + 3$

(d) $f(x) = x^2 - 3$

(b) $g(x) = |x|$

(e) $h(x) = \sqrt{x - 2}$

(c) $g(x) = x^3 + 2$

7. Assume $g(x) = 3x^2 - 2x$, find :

(a) $g(0)$

(d) $g(a)$

(b) $g(-1)$

(e) $g(2a)$

(c) $g(3)$

(f) $g(a - 1)$

8. Find the domain of $f(x)$ :

(a) $f(x) = \dfrac{2}{x-3}$

(c) $f(x) = \dfrac{2}{3x-5}$

(b) $f(x) = 3x - 1$

(d) $f(x) = |4x - 3|$