**NOTES**

Name:_____

As we learned earlier this year, a **coordinate system** is used to locate points. The horizontal number line is called the **x-axis** and the vertical number line is called the **y-axis**. The point where the two axes intersect is the **origin** (0, 0). An **ordered pair** of numbers is used to locate points in the coordinate plane. The point (4, 3) has an **x-coordinate** of 4 and a **y-coordinate** of 3.
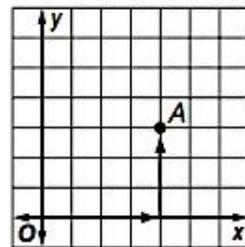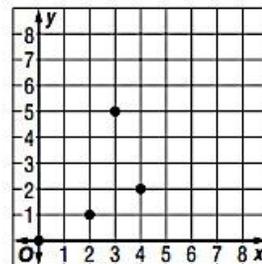
A set of ordered pairs is called a **relation**.
The set of x-coordinates is called the **domain**.
The set of y-coordinates is called the **range**.

Example: The relation {(0, 0), (2, 1), (4, 2), (3, 5)} has been expressed as a table and as a graph below. Determine the domain and range.

Domain:

Range:

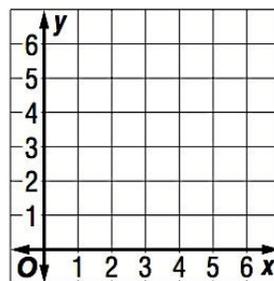| x	y
0	0
2	1
4	2
3	5

Express the relation {(4,6), (0,3), (1,4)} as a table and a graph. Then determine the domain and range.

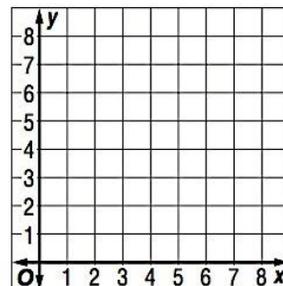Domain:

Range:

x	y

If each value of the domain is paired with one and only one value of the range, then the relation is a **function**. The two examples above are functions.

Let's look at the relation {(5,7), (2,2), (6,0), (5, 3)}

x	y

You can tell whether a graphed relation is a function by using the **vertical line test**. Visualize a vertical line that moves left to right through the coordinate plane. If the vertical line ever intersects the plotted graph in more than one point, then the relation is *not* a function.

Use the vertical line test to determine if each relation is a function.

a.

b.

c.
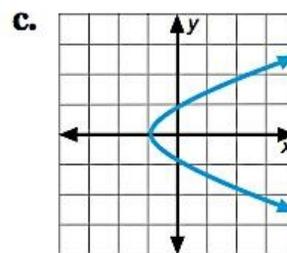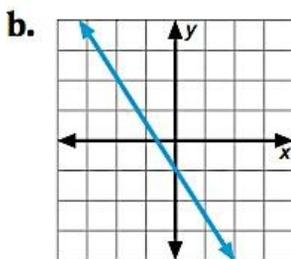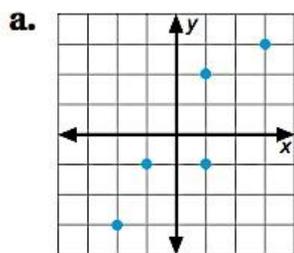
Use the relation to determine the following.

{(3, 5), (4, 8), (5, 10), (6, 8), (7, 9)}

a. domain   **b.** range   **c.** Is the relation a function?

The description of a function is a **function rule**. For example, if x is the domain, then the *add 5 rule* becomes $x+5$. A symbol like $f(x)$ or $g(x)$ denotes the range assigned to x. The function is written $f(x) = x+5$, and the ordered pair is $(x, f(x))$.

The function $f(x) = x+5$ is read "f of x equals x plus five". To evaluate a function at a given value of the domain, substitute the value into the function.

Example: If $x = 1$ then $f(1) = 1 + 5$, or 6   If $x = 4$ then $f(4) = 4 + 5$, or 9.