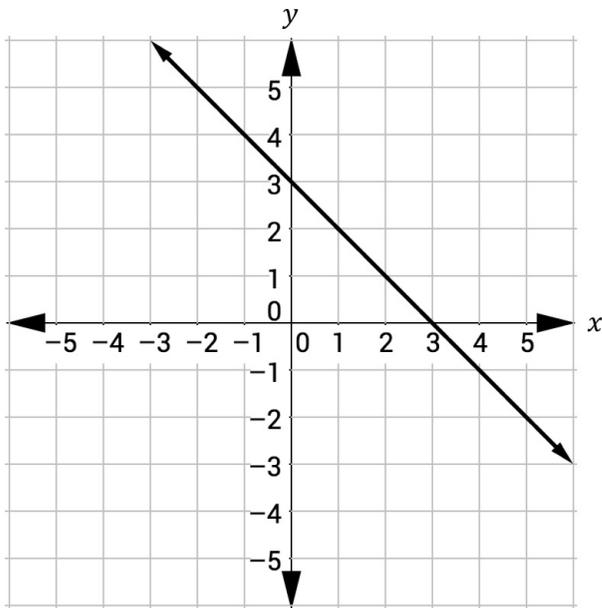## Section 3 – Topic 7
Key Features of Graphs of Functions – Part 1

Let's review the definition of a function.

Every input value (x) corresponds to _____ _____
output value (y).
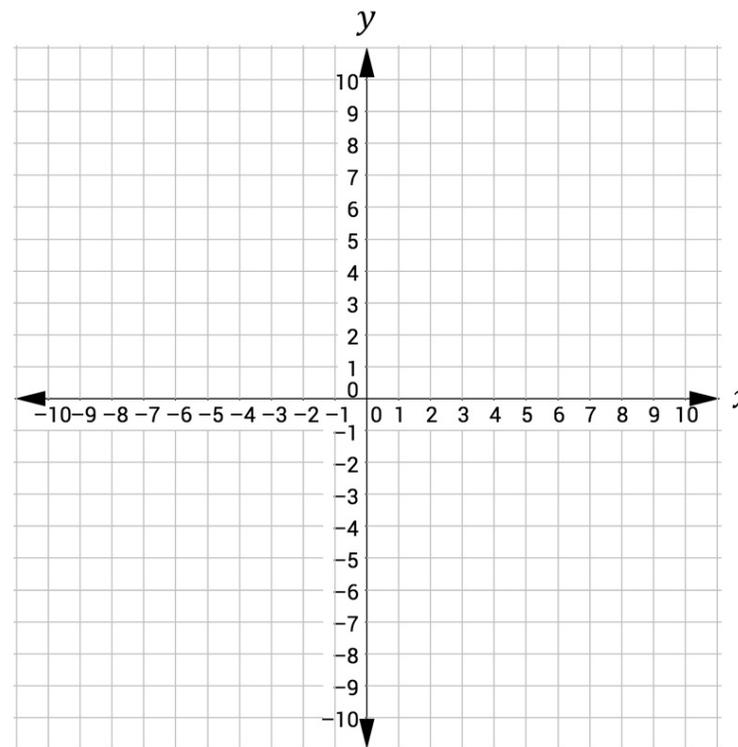
Consider the following graph.

How can a vertical line help us quickly determine if a graph represents a function?

We call this the **_vertical line test_**. Use the vertical line test to determine if the graph above represents a function.
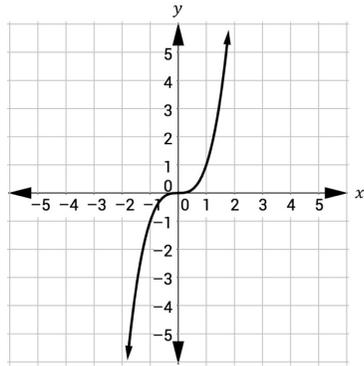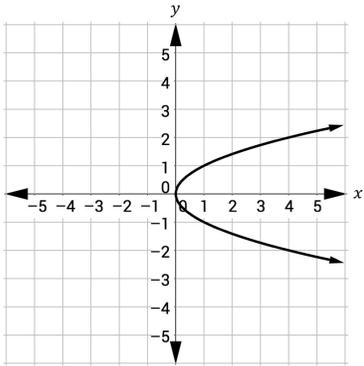
Important facts:

➢ Graphs of lines are not always functions. Can you describe a graph of a line that is not a function?

➢ Functions are not always linear.

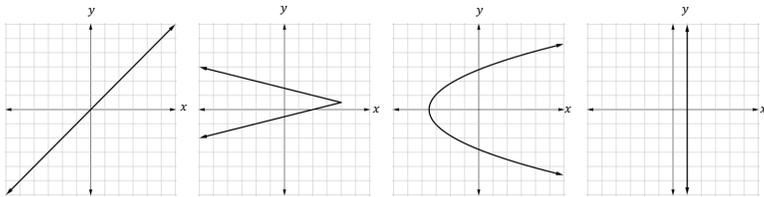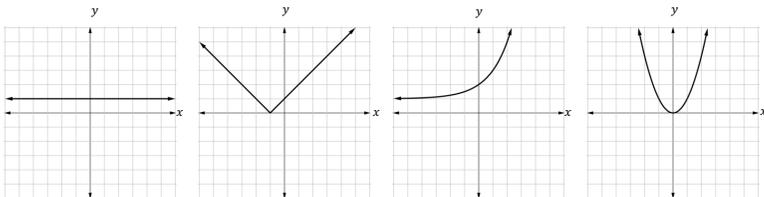Sketch a graph of a function that is not linear.

Let's Practice!

1. Use the vertical line test to determine if the following graphs are functions.

Try It!

2. Which of the following graphs represent functions? Select all that apply.

3. Consider the following scenarios. Determine if each one represents a function or not.

   a. An analyst takes a survey of people about their heights (in inches) and their ages. She then relates their heights to their ages (in years).

   b. A geometry student is dilating a circle and analyzes the area of the circle as it relates to the radius.

   c. A teacher has a roster of 32 students and relates the students' letter grades to the percent of points earned.

   d. A boy throws a tennis ball in the air and lets it fall to the ground. The boy relates the time passed to the height of the ball.

MATH NATION

It's important to understand key features of graphs.

> An **x-intercept** of a graph is the location where the graph crosses the _____.

> The y-coordinate of the x-intercept is always _____.

> The **y-intercept** of a graph is the location where the graph crosses the _____.

> The x-coordinate of the y-intercept is always _____.

> The x-intercept is the _____ to $f(x) = 0$.

All of these features are very helpful in understanding real-world context.

Let's Practice!

4. Consider the following graph that represents the height, in feet, of a water balloon dropped from a 2nd story window after a given number of seconds.

Water Balloon Dropping
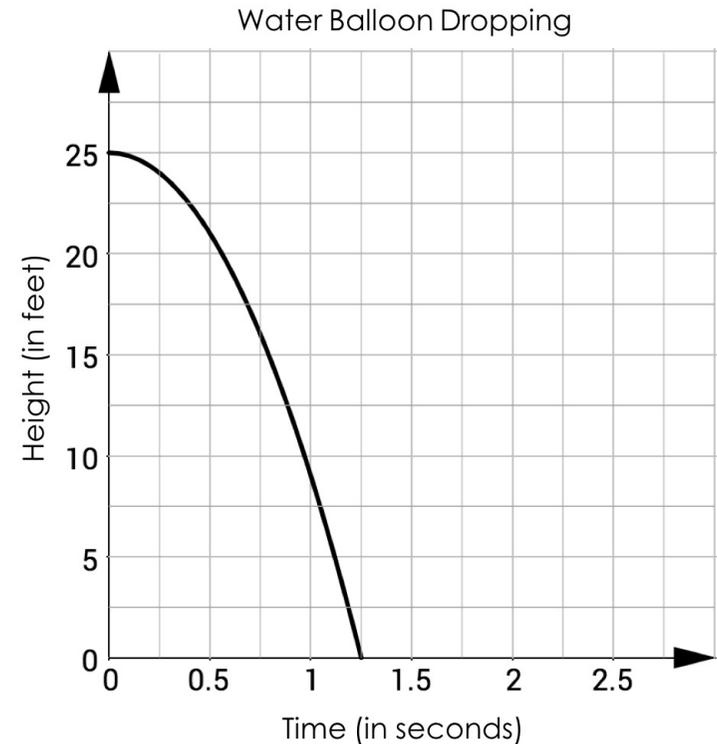
a. What is the x-intercept?

b. What is the y-intercept?

c. Label the intercepts on the graph.

Try It!

5. Refer to the previous problem for the following questions.

   a. What does the y-intercept represent in this real-world context?

   b. What does the x-intercept represent in this real-world context?

   c. What is the solution to this situation?

Section 3 – Topic 8
Key Features of Graphs of Functions – Part 2

Let's discuss other key features of graphs of functions.

➢ **Domain**: the input or the _____ values.

➢ **Range**: the _____ or the y-values.

➢ **Increasing intervals**: as the x-values _____, the y-values _____.

➢ **Decreasing intervals**: as the x-values _____, the y-values _____.

➢ **Relative maximum**: the point on a graph where the interval changes from _____ to _____.

➢ **Relative minimum**: the point on a graph where the interval changes from _____ to _____.

STUDY EDGE TIP

We read a graph from left to right to determine if it is increasing or decreasing, like reading a book.