



# Concepts and Examples Horizontal and Vertical Lines

Based on power point presentations by Pearson Education, Inc.  
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# Learning Objectives

1. Write and graph horizontal lines.
2. Write and graph vertical lines.

# 1. The Equation of a Horizontal Line (1 of 3)

We will now discuss two equations in two variables which, at first glance, don't seem to consist of two variables.

The **general form** of a **Horizontal Line** is

$$y = b \text{ where } b \text{ can be any real number}$$

There is no  $x$ -variable in this equation!!! However, it is still considered an equation in two variables **as long as you are told that's what it is.**

In this case, it is simply assumed that  $x$  can take on all real values with the  $b$  being the  $y$ -value of all points on the horizontal line.

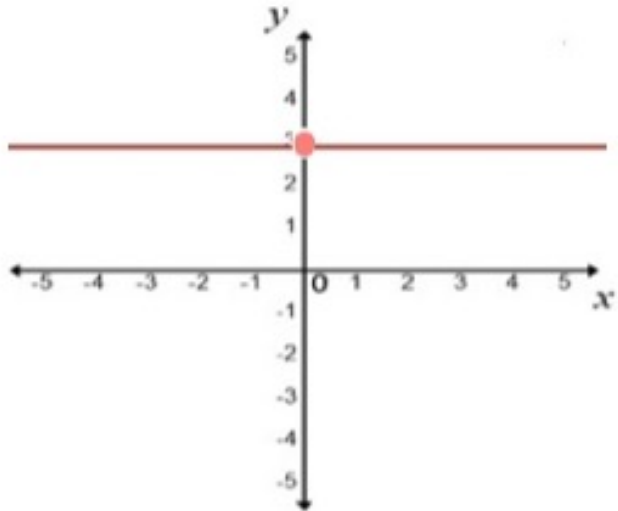
The graph of this equation is a horizontal line parallel to the  $x$ -axis where  $b$  is the  $y$ -intercept and the ordered pair associated with the  $y$ -intercept is **(0, b).**

# The Equation of a Horizontal Line (2 of 3)

Example 1:

Graph the line  $y = 3$  by hand.

We are told that  $y = 3$  is a line. From the equation we know that we are dealing with a horizontal line parallel to the  $x$ -axis. We note that the  $y$ -intercept is 3. Therefore, the ordered pair associated with this intercept is  $(0, 3)$ . Let's plot this ordered pair and then simply draw a horizontal line through it that is parallel to the  $x$ -axis.



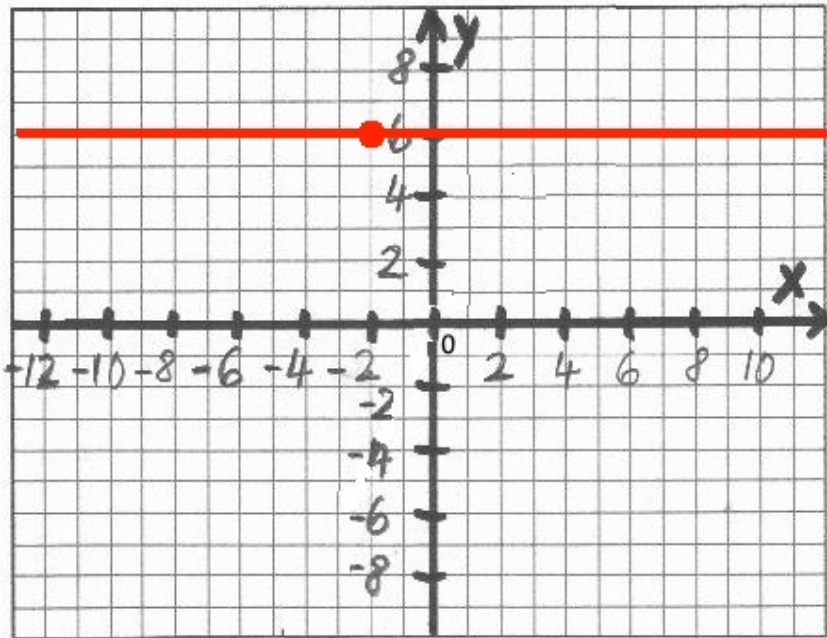
You MUST memorize that the general equation of a horizontal line is  $y = b$  where  $b$  can be any real number.

# The Equation of a Horizontal Line (3 of 3)

Example 2:

Write an equation of a horizontal line through the point created by the ordered pair  $(-2, 6)$ .

To help us with the task, let's plot the ordered pair  $(-2, 6)$  and then draw a horizontal line through it that is parallel to the  $x$ -axis.



We know that a horizontal line has an equation of  $y = b$ , where  $b$  is the  $y$ -intercept of the line.

In the graph, we see that the  $y$ -intercept is 6.

Therefore, the equation of the horizontal line through the point created by the ordered pair  $(-2, 6)$  must be  $y = 6$ .

## 2. The Equation of a Vertical Line (1 of 3)

The **general form** of a **Vertical Line** is

$$x = a \text{ where } a \text{ can be any real number}$$

There is no  $y$ -variable in this equation!!! However, it is still considered an equation in two variables **as long as you are told that's what it is.**

In this case, it is simply assumed that  $y$  can take on all real values with the  $a$  being the  $x$ -value of all points on the vertical line.

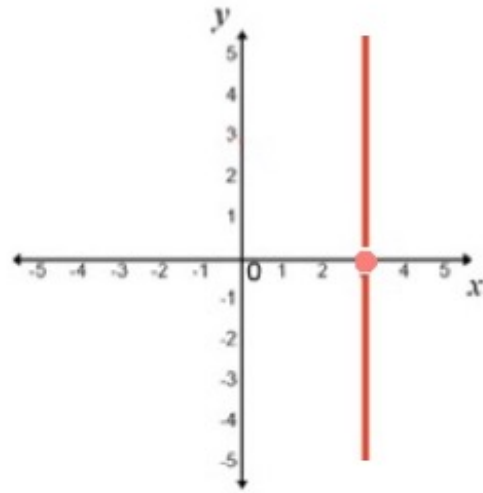
The graph of this equation is a vertical line parallel to the  $y$ -axis where  $a$  is the  $x$ -intercept and the ordered pair associated with the  $x$ -intercept is  **$(a, 0)$ .**

# The Equation of a Vertical Line (2 of 3)

Example 3:

Graph the line  $x = 3$  by hand.

We are told that  $x = 3$  is a line. From the equation we know that we are dealing with a vertical line parallel to the  $y$ -axis. We note that the  $x$ -intercept is 3. Therefore, the ordered pair associated with this intercept is  $(3, 0)$ . Let's plot this ordered pair and then simply draw a vertical line through it that is parallel to the  $y$ -axis.



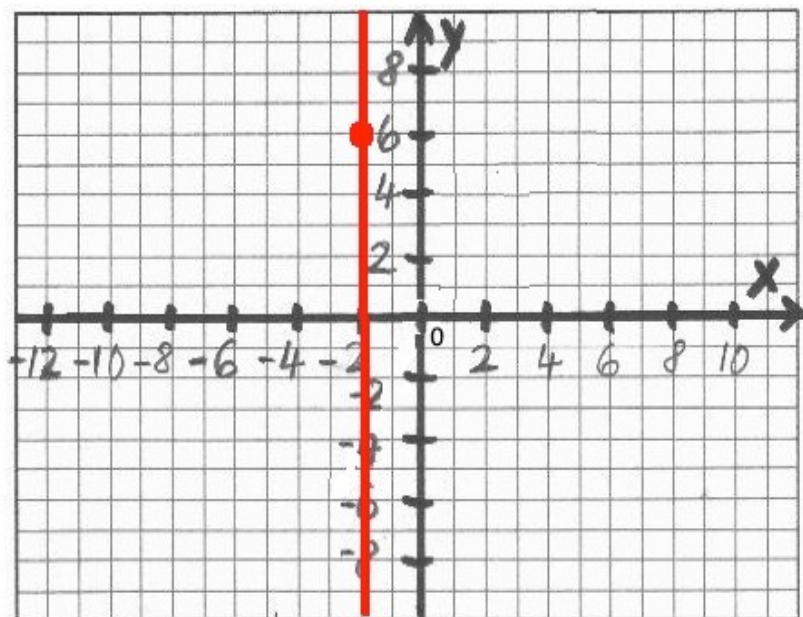
You MUST memorize that the general equation of a vertical line is  $x = a$  where  $a$  can be any real number.

# The Equation of a Vertical Line (3 of 3)

Example 4:

Write an equation of a vertical line through the point created by the ordered pair  $(-2, 6)$ .

To help us with the task, let's plot the ordered pair  $(-2, 6)$  and then draw a vertical line through it that is parallel to the  $y$ -axis.



We know that a vertical line has an equation of  $x = a$ , where  $a$  is the  $x$ -intercept of the line.

In the graph, we see that the  $x$ -intercept is  $-2$ .

Therefore, the equation of the vertical line through the point created by the ordered pair  $(-2, 6)$  must be  $x = -2$ .