



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.

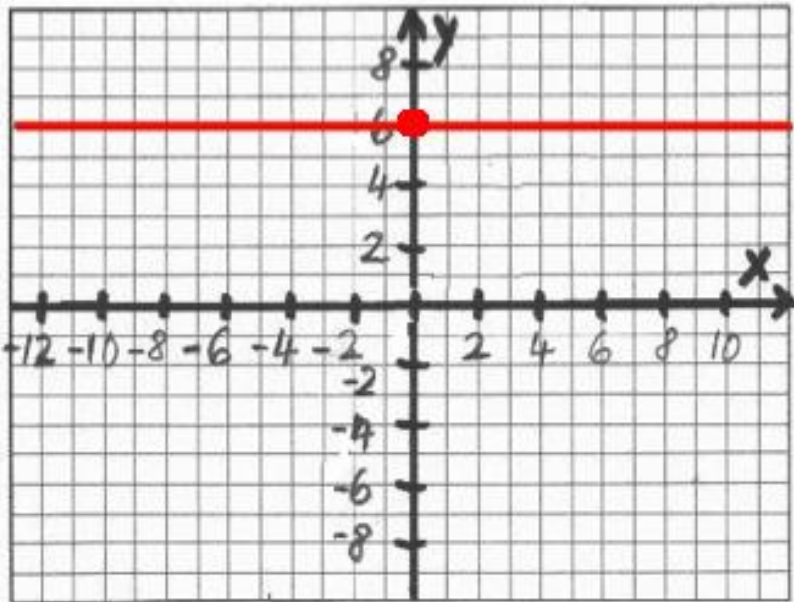
The graph of this equation is a horizontal line parallel to the x -axis where b is the y -intercept and the ordered pair associated with the y -intercept is **(0, b).**

The Equation of a Horizontal Line (2 of 3)

Example 1:

Graph the line $y = 6$ by hand.

We are told that $y = 6$ is a line. From the equation we know that we are dealing with a horizontal line parallel to the x -axis. We note that $b = 6$ which is the y -intercept. Therefore, the ordered pair associated with this intercept is $(0, 6)$. Let's plot this ordered pair and then simply draw a horizontal line through it that is parallel to the x -axis.



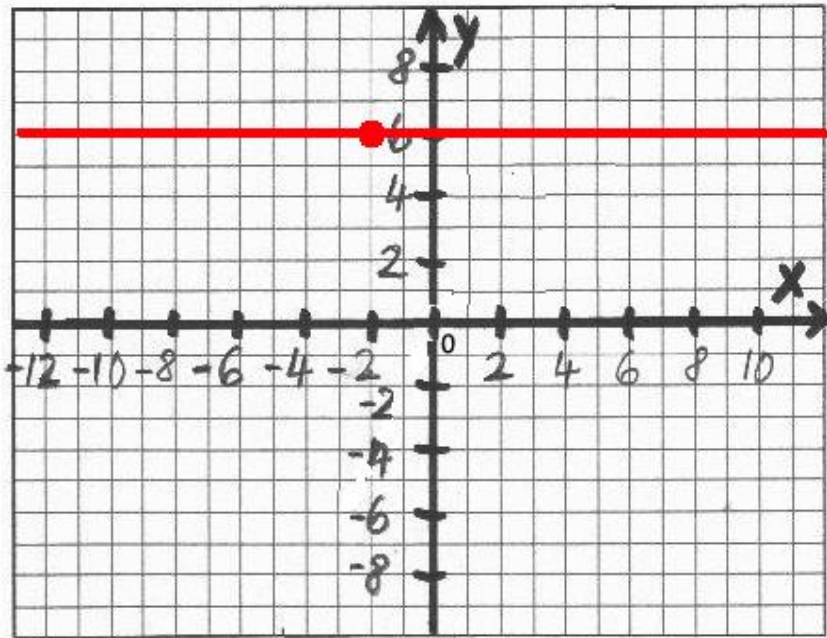
You MUST memorize that the general equation of a horizontal line is $y = b$ where b can be any real number.

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.

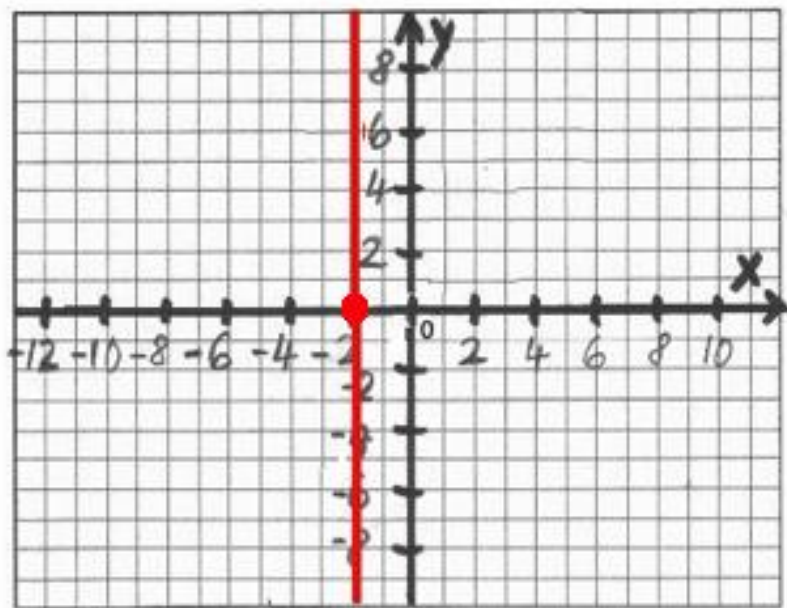
The graph of this equation is a vertical line parallel to the y -axis where a is the x -intercept and the ordered pair associated with the x -intercept is **$(a, 0)$.**

The Equation of a Vertical Line (2 of 3)

Example 3:

Graph the line $x = 2$ by hand.

We are told that $x = 2$ is a line. From the equation we know that we are dealing with a vertical line parallel to the y -axis. We note that $a = 2$ which is the x -intercept. Therefore, the ordered pair associated with this intercept is $(2, 0)$. Let's plot this ordered pair and then simply draw a vertical line through it that is parallel to the y -axis.



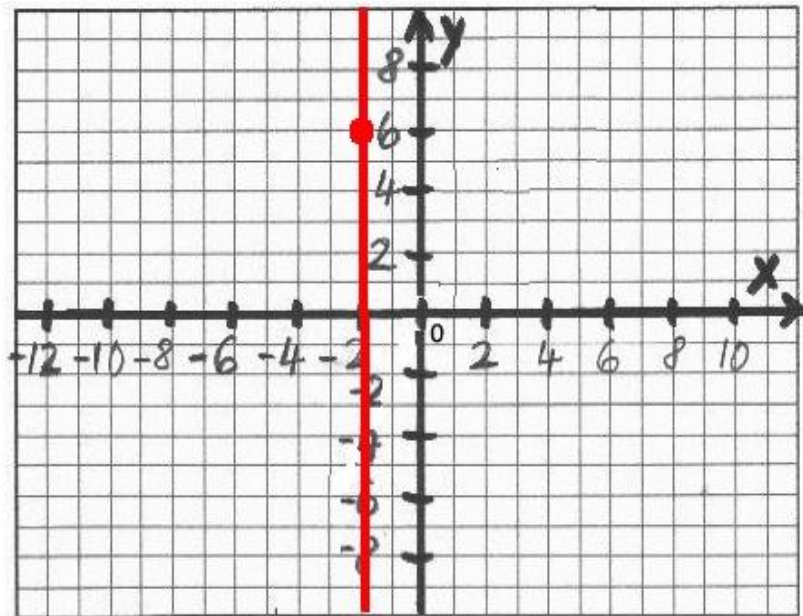
You **MUST** memorize that the general equation of a vertical line is $x = a$ where a can be any real number.

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 $x = -2$.