



Horizontal and Vertical Lines

Based on power point presentations by Pearson Education, Inc.
Revised by Ingrid Stewart, Ph.D.

Learning Objectives

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

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

1. The Equation of a Horizontal Line

The general equation of a horizontal line is $y = b$ where " b " can be any real number.

There is no x -variable in this equation!!! However, it is still considered to be an equation in two variables.

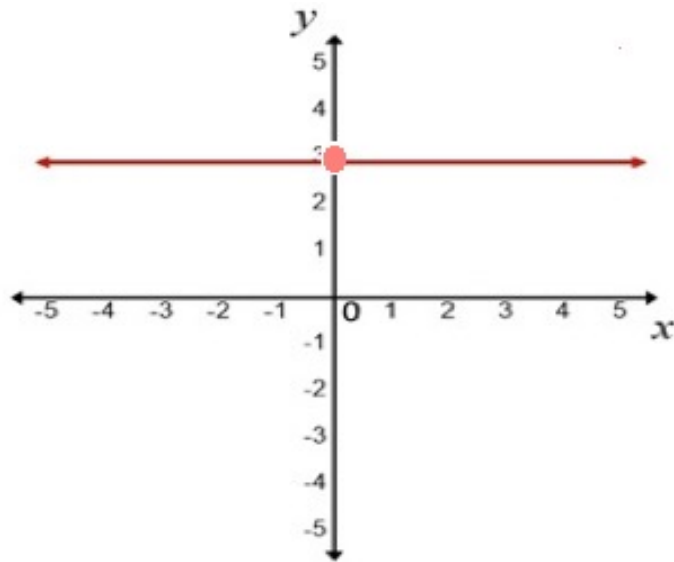
In this case, it is simply assumed that x can take on all real values with the " b " being the y -value of all points on the horizontal line.

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

Example 1: Graphing a Horizontal Line

Graph $y = 3$ in a rectangular coordinate system.

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, and the point associated with this intercept is $(0, 3)$. Let's plot this point and then simply draw a horizontal line through it that is parallel to the x -axis.

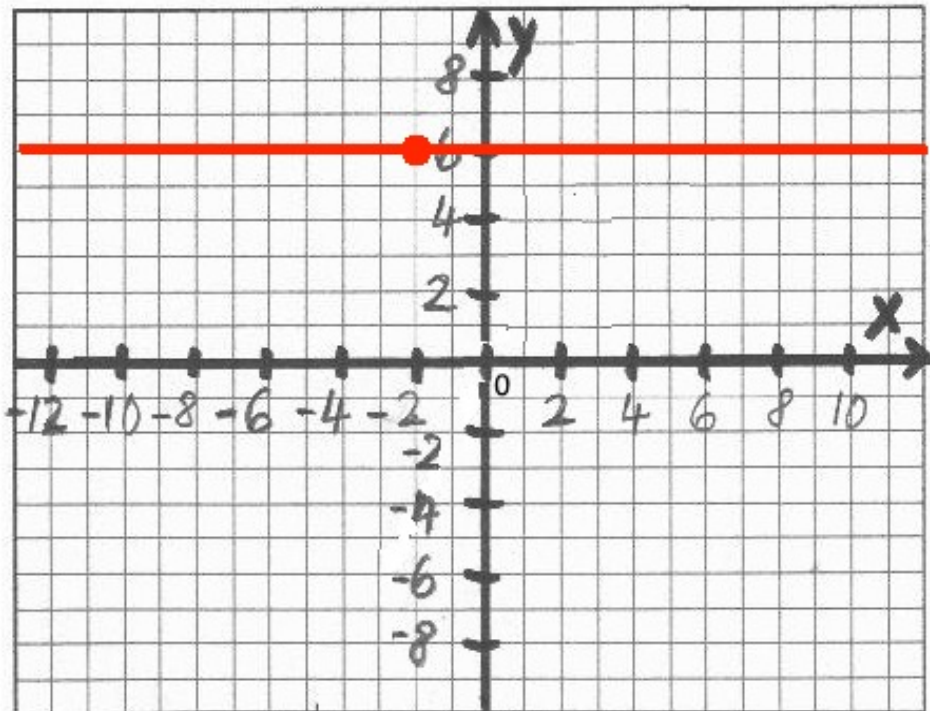


You MUST memorize that $y = b$ pictorially is a horizontal line!

Example 2: Write an Equation of a Horizontal Line

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

To help us with the task, let's plot the point $(-2, 6)$ 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 $(-2, 6)$ must be $y = 6$.

2. The Equation of a Vertical Line

The general equation of a vertical line is $x = a$ where “ a ” can be any real number.

There is no y -variable in this equation!!! However, it is still considered to be an equation in two variables.

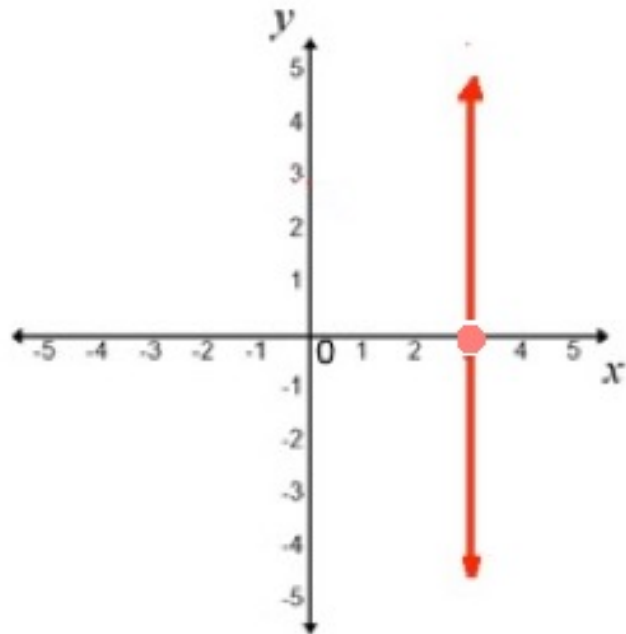
In this case, it is simply assumed that y can take on all real values with the “ a ” being the x -value of all points on the vertical line.

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

Example 3: Graphing a Vertical Line

Graph $x = 3$ in a rectangular coordinate system.

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, and the point associated with this intercept is $(3, 0)$. Let's plot this point and then simply draw a vertical line through it that is parallel to the y -axis.

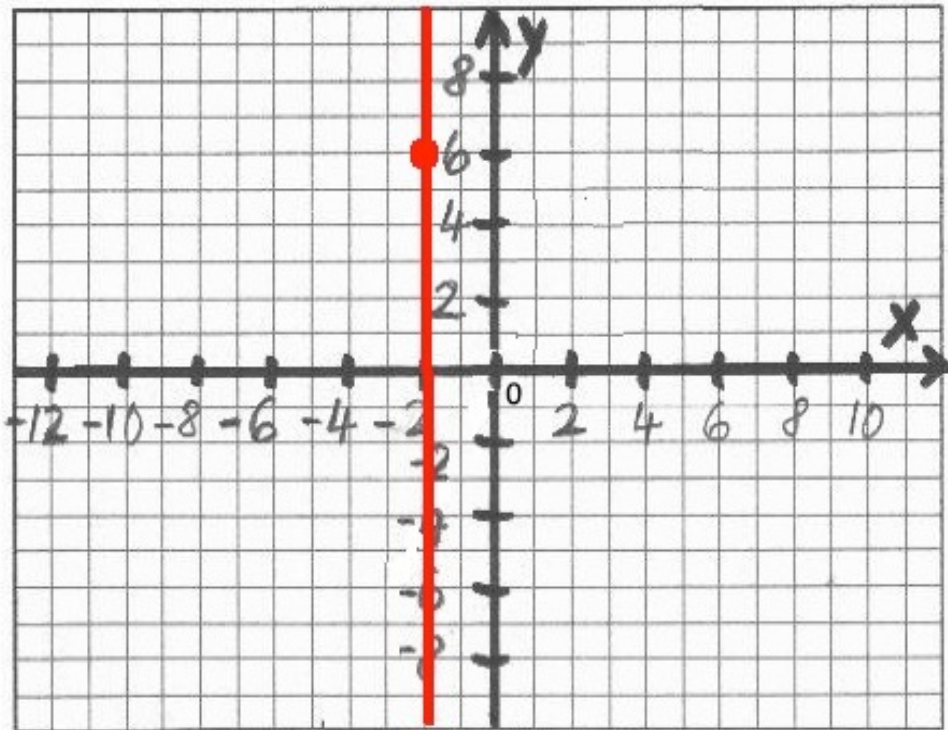


You MUST memorize that $x = a$ pictorially is a vertical line!

Example 4: Write an Equation of a Vertical Line

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

To help us with the task, let's plot the point $(-2, 6)$ 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 $(-2, 6)$ must be $x = -2$.