Math 1111 – Graphs and Graphing Utlities

Objectives:

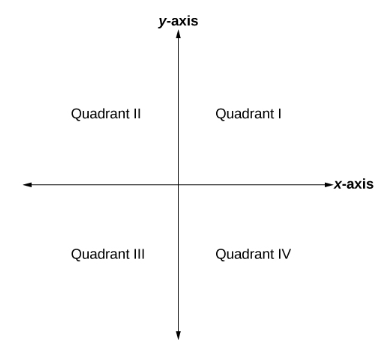
1. Plot points in the rectangular coordinate system

2. Graph equations in the rectangular coordinate system

3. Interpret information using a viewing rectangle or table

4. Interpret information given by graphs

The Cartesian coordinate system, (aka the rectangular coordinate system) is based on a two-dimensional plane. An old story describes how seventeenth-century philosopher/mathematician René Descartes invented the system that has become the foundation of algebra while sick in bed. According to the story, Descartes was staring at a fly crawling on the ceiling when he realized that he could describe the fly’s location in relation to the perpendicular lines formed by the adjacent walls of his room. He viewed the perpendicular lines as horizontal and vertical axes. Further, by dividing each axis into equal unit lengths, Descartes saw that it was possible to locate any object in a two-dimensional plane using just two numbers—the displacement from the horizontal axis and the displacement from the vertical axis.

 Descartes named the horizontal axis the x-axis and the vertical axis the y-axis. The axes, which are perpendicular, divide the plane into 4 quadrants. The quadrants are numbered counterclockwise.

The center of the plane is the point where the two axes cross. This is known as the origin, or point (0, 0). From the origin, each axis s further divided into equal units, increasing, positive numbers to the right and above the origin; decreasing, negative numbers to the left and below the origin.

Each point in the plan is identified by its x-coordinate (horizontal shift from the origin), and its y-coordinate (vertical shift from the origin). These are written as an ordered pair in the form (x, y).

**Objective 1:** Plot points in the rectangular coordinate system.

When plotting a coordinate pair in the rectangular coordinate system, move the x-value the specific number of units to the right or left, then move the y-value the specific number of units up or down. If a coordinate pair has a zero for the x-value, then you have a y-intercept and if you have a zero for the y-value, then you have an x-intercept. This means that the point will lie on the y-axis or the x-axis.

Example #1: Plot the points on the rectangular coordinate system. Label each point with their letter.



A (-2, 4) B (3, -3) C (5, 7)

D (0, -6) E (9, -7) F (4, 0)

**Objective 2:** Graph equations in the rectangular coordinate system.

To graph an equation, we can plot points. It is easier to make a table for the values. Once we have found some points, we can sketch the graph.

Example #2: Graph the equations in the rectangular coordinate system. Complete the table to find the coordinate points.



A. y = 2x – 1

|  |  |  |
| --- | --- | --- |
| x | y | (x, y) |
| -2 |  |  |
| -1 |  |  |
| 0 |  |  |
| 1 |  |  |
| 2 |  |  |



B. y = x2 – 5

|  |  |  |
| --- | --- | --- |
| x | y | (x, y) |
| -2 |  |  |
| -1 |  |  |
| 0 |  |  |
| 1 |  |  |
| 2 |  |  |



C. y = | x + 2 | + 3

|  |  |  |
| --- | --- | --- |
| x | y | (x, y) |
| -4 |  |  |
| -3 |  |  |
| -2 |  |  |
| -1 |  |  |
| 0 |  |  |

**Objective 3:** Interpret information using a viewing rectangle or table.

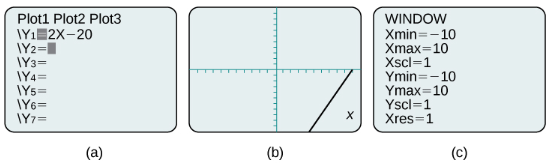
Graphing calculators can be used to graph equations. Equations must be manipulated to be in the form of “y = “ before it can be entered into the calculator.

Use a graphing calculator to graph -2x + y = -20. First, manipulate the equation to be y = 2x – 20.

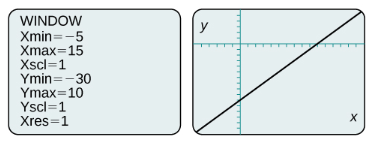
a. Enter this equation into the calculator.

b. Graph the function.

c. Adjust the windows, if needed.



Adjust the windows so that a better view of the graph can be seen.



If we are interested in seeing the coordinate points, click on 2nd GRAPH to display the table of values.

OpenStax College Algebra, College Algebra. OpenStax CNX. Aug 2, 2019 http://cnx.org/contents/9b08c294-057f-4201-9f48-5d6ad992740d@11.1.