Chapter P Prerequisites

Course/Section
Lesson Number
Date

Section P.2 Graphs of Equations

Section Objectives: Students will know how to sketch the graphs of equations by point plotting or using a graphing utility.

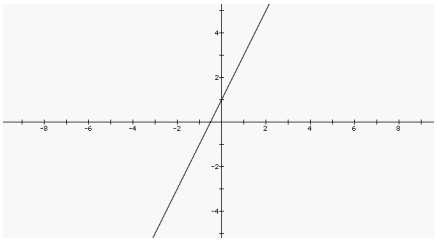
I. The Graph of an Equation (pp. 14 – 15) Pace: 10 minutes

- A solution of an equation in two variables, x and y, is an ordered pair, (a, b), such that when x is replaced by a, and y is replaced by b, the resulting equation is a true statement. A graph of an equation of this type is the collection of all points in the rectangular coordinate system which correspond to a solution of the equation.

Example 1. Sketch the graph of the following.

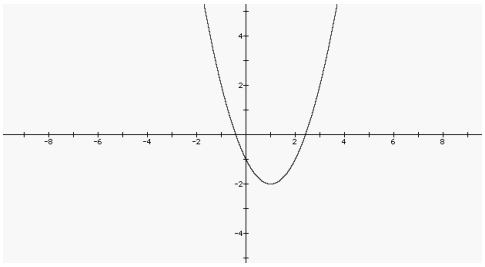
a) $y = 2x + 1$

x	-2	-1	0	1	2
$y = 2x + 1$	-3	-1	1	3	5



b) $y = x^2 - 2x - 1$

x	-3	-2	-1	0	1	2	3
$y = x^2 - 2x - 1$	14	7	2	-1	-2	-1	2

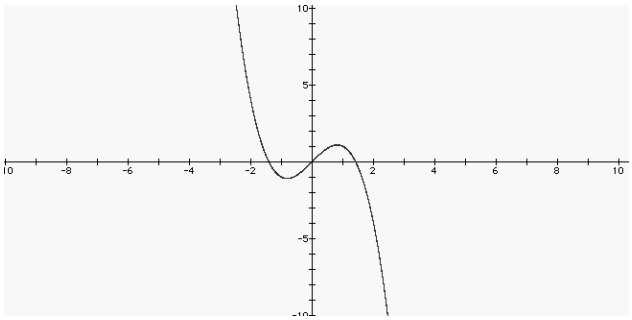


- Note that point-plotting is easy, but as our equations get more complicated we will need to have other methods.

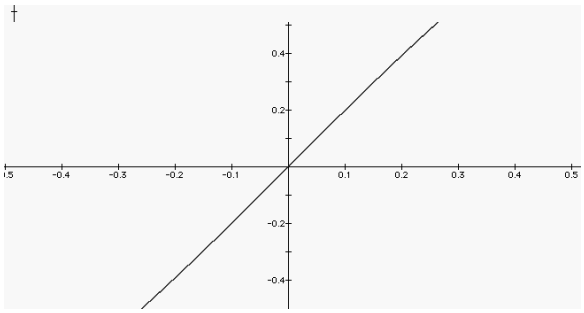
II. Using a Graphing Utility (pp. 16 - 19) Pace: 10 minutes

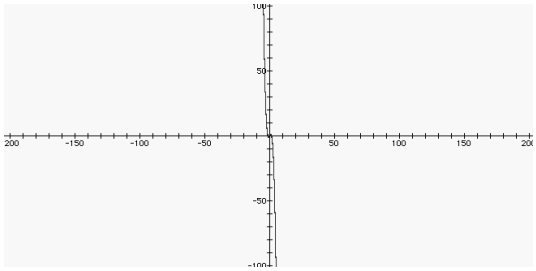
- State the following **procedure for using a graphing utility to graph an equation.**
  1. Rewrite the equation so that *y* is isolated on the left side.
  2. Enter the equation into the graphing utility.
  3. Determine a *viewing window* that shows all important features of the graph.
  4. Graph the equation.

Example 2. Use a graphing utility and four different window settings to graph $x^3 + y - 2x = 0$.
First we solve the equation for *y* obtaining $y = -x^3 + 2x$. Then, using the standard view window, we get the following graph.



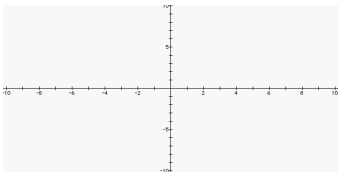
This is a good viewing window, allowing us to see all important features of the graph. The following would be poor choices.



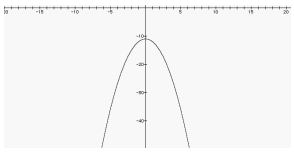


- Although the standard viewing window worked well in the previous example, as we in the following example, it may not always be the best choice.

Example 3. Use a graphing utility to graph $y = -x^2 - 11$.



Standard window



Adjusted window

Tip: State that some graphs, such as circles, are best graphed using the s*quare setting*.

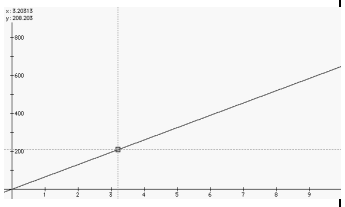
III. Applications (pp. 19 - 20) Pace: 5 minutes

Example 4. You can drive at a constant speed of 65 mph.

a) How far can you drive in 3.2 hours?

Equation: $d = r \bullet t = 65t$

Graphical Solution



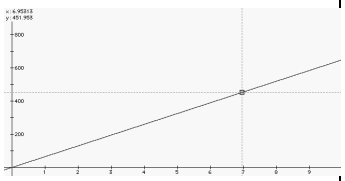
≈ 208.2 miles.

Algebraic Solution:

$d = 65t$
$= 65(3.2)$
≈ 208.2

b) How long would it take you to drive 452 miles?

Graphical Solution



≈ 7 hours

Algebraic Solution:

$d = 65t$
$452 = 65t$
$452/65 = t$
≈ 7 hours