

Using Graphing Calculators to Graph Equations Video Lecture

Sections 1.1 and 1.3

Course Learning Objectives:

- 1) Graph functions and use such graphs to solve applied problems and to understand the significance of attributes of the graph to such applied problems.
- 2) Identify and articulate the significance of graphical components in a mathematical model/application.

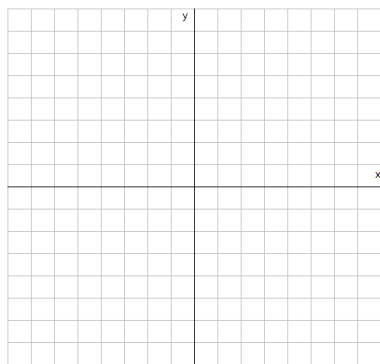
Weekly Learning Objectives:

- 1) Graph equations using a graphing utility.
- 2) Use a graphing utility to approximate intercepts.
- 3) Solve equations using a graphing utility.
- 4) Use a graph to solve inequalities.
- 5) Find a good viewing window on a graphing utility.
- 6) Use a graphing utility to find where two graphs intersect.

Using a Graphing Calculator to Graph Equations

The graphing calculator is a helpful tool when trying to graph equations, especially messy equations. However, we still need to have a good idea of what to expect the graph to look like, because graphing calculators can only show us a particular window of the graph at a time. If we are not looking at the right window, we may miss important information about our graph.

Sketch the graph of $y = 2x + 10$ by hand, noting the x and y-intercepts.



Now graph $y = 2x + 10$ on your graphing calculator. If we look only in a window where x ranges between -1 and 1 and y ranges between -1 and 1, then what would we see?

So if the window is too small, we may not see the solutions to the graph. If the window is too large, we may lose the detail of the graph and be misled by its simplicity.

Enter the equation $y = x^2 + 7x - 60$ into y2 on your calculator. Practice toggling on/off the different graphs (by moving your cursor over the equal sign and pressing ENTER). Set the window to the standard window (use Zoom Std). Find the best window dimensions to show a more complete and accurate graph.

Sketch a graph of $y = x^2 + 10$ in each of the following windows.

Which gives the best view?

a) Standard window

b) x: [-10,10] y: [-20,20]

c) x: [-5,5] y: [0,35]

d) x: [-1,1] y: [0,20]

Sketch the graph of $y = x^2 + 4x - 12$

Use the graph to find the solutions to $x^2 + 4x - 12 = 0$ on the interval $[-10, 10]$.

Use the graph above in the standard window to solve the inequality $x^2 + 4x - 12 \leq 0$

Use the graph to solve the inequality $x^2 + 4x - 12 > 0$

Sketch the graph of $y = x^3 - x + .38$ in the standard window. Find a better window to show clearly how many x-intercepts are on the graph.

Does this view of the graph also represent a global view of the functions solutions? In other words, do you still see all of the interesting detail in the graph? Many times we will need to look at multiple views of a graph to see both a global view and a close-up view that is necessary to see desired details.

Graph window. $y = x^3 - 4x$ and $y = 2.31\sqrt{x+3}$ on the calculator in the standard

How many times do the two graphs intersect? Find the solutions to the equation rounded to two decimal places.

What would you have to do to solve this algebraically?

$$4x^4 - 3 = 2x + 1$$

Find the solution(s) to the equation:

Option 1:

- 1) Set the equation to zero
Y1
- 2) Type in equation into Y1

Option 2:

- 1) Type in the left side of the equation into
- 2) Type in the right side of the equation

The TI-83/84/85/86 will not graph relations such as circles or ellipses unless we first change the equation into two functions.

Solve the following circle equation for y: $x^2 + 4x + y^2 - 5 = 0$

Enter each of these into the graphing calculator in order to graph them. Find a good window.