

Solving systems of equations graphically  
Calculator worksheet

NAME:

We will graphically solve systems of linear equations by using our calculators to graph the functions and calculate the intersection. If an equation is not solved for  $y$  to begin with, we need to do that first since our calculator cannot graph it otherwise. We will then graph both equations, find an appropriate window, and use the calculator to find the exact point of intersection. See the worksheet Graphing Calculator Basics for instructions on graphing.

1. Solve the system.

$$y = \frac{1}{2}x + 3$$

$$y = -1x + 6$$

Enter the two functions into the **y editor** into the slots for **Y<sub>1</sub>** and **Y<sub>2</sub>**. Put the fraction in parentheses. Graph them on the **Standard window**.

Copy the screen below. Try to roughly plot the intersection and general angles of the lines correctly but do not spend too much time on it.

Now, we could estimate the intersection by looking at the graph but we want to be more accurate. So we will use the calculator to calculate the intersection exactly. Follow the instructions below. (Disregard paragraphs that do not apply to your calculator.) By the way, even though we are graphing lines, the calculator refers to everything as “curves”.

On the 82, 83, and 84, enter the **CALCULATE** menu by pressing **2<sup>nd</sup>** then **TRACE**. Choose **INTERSECT**. It will ask for the **first curve**, **second curve**, and then a **guess**. The first curve is simply the first graph I want to use. Press **ENTER** to select the first curve. (The cursor will automatically be on the graph of **Y<sub>1</sub>**. You press **ENTER** to say you want **Y<sub>1</sub>**.) The cursor will then switch to the graph of **Y<sub>2</sub>**. Press **ENTER** to select it. It will then ask for a **guess**. You want to move the cursor near the point of intersection. Press **ENTER** when the cursor is near the intersection point.

On the 85, press **MORE** to access the **MATH** menu. After selecting **MATH**, then press **MORE** again to find and select the **ISECT** option. It will put a cursor on the screen on the graph of  $y_1$  and a little **1** in the upper right corner (to indicate it's on  $y_1$ ). Press **ENTER** to indicate you want to use this  $y_1$  graph. Then it puts the cursor on the second graph and a little **2** in the upper right corner. Move the cursor (using the left and right arrows) closer to the intersection and press **ENTER** again. You are essentially telling it which two graphs you want the intersection of. It will then calculate the point of intersection.

On the 86, press **MORE** to get to the **MATH** menu. Select **MATH**. Then press **MORE** again to get to the option **ISECT** (stands for intersection). Select this option. It will ask for the **first curve**, **second curve**, and then a **guess**. The first curve is simply the first graph I want to use. Press **ENTER** to select the first curve. (The cursor will automatically be on the graph of  $y_1$ . You press **ENTER** to say you want  $y_1$ .) The cursor will then switch to the graph of  $y_2$ . Press **ENTER** to select it. It will then ask for a **guess**. You want to move the cursor near the point of intersection. Press **ENTER** when the cursor is near the intersection point.

You know you are done when it says "Intersection" on screen and gives you an  $x$  and  $y$  coordinate. Write this intersection in ordered pair notation next to the intersection on your graph.

Use the same procedure to solve the following systems. Use the Standard window unless specified otherwise. Round your answers to two decimal places (hundredth place) if applicable.

2. Solve the system.

$$y = \frac{2}{3}x + 4$$

$$y = -3x + 9$$

Enter the two functions into the **y editor** into the slots for **Y<sub>1</sub>** and **Y<sub>2</sub>**. Put the fraction in parentheses. Graph them on the **Standard window**.

Copy the screen below. Try to roughly plot the intersection and general angles of the lines correctly but do not spend too much time on it.

Find the exact intersection and label it on your graph.

3. Solve the system.

$$2x - 3y = 8$$

$$x - 2y = 6$$

Enter the two functions into the **y editor** into the slots for **Y<sub>1</sub>** and **Y<sub>2</sub>**.  
You first need to solve each for **y**. Graph them on the **Standard window**.

Copy the screen below. Try to roughly plot the intersection and general angles of the lines correctly but do not spend too much time on it.

Find the exact intersection and label it on your graph.

Solve 1<sup>st</sup> equation for y:

$$2x - 3y = 8$$

$$-3y = 8 - 2x$$

$$\frac{-3y}{-3} = \frac{8 - 2x}{-3}$$

$$y = \frac{8 - 2x}{-3}$$

Input  $y = \frac{8 - 2x}{-3}$  into  
calculator as  $Y_1 = (8 - 2x)/-3$

4. Solve the system.

$$y = 7x + 12$$

$$5x + y = 20$$

Enter the two functions into the **y editor** into the slots for **Y<sub>1</sub>** and **Y<sub>2</sub>**. You first need to solve the second equation for *y*. Start on the **Standard window**.

Copy the screen below. Try to roughly plot the intersection and general angles of the lines correctly but do not spend too much time on it.

Find the exact intersection and label it on your graph.

Notice when you graph the lines, they look to intersect but off the top of the screen somewhere. Adjust your **WINDOW** dimensions to see more above the current screen.

Try a **Ymax** of 25.