**Cheat Sheet: graphing lines on a TI-83 calculator**

**Step 1: Enter the equations**

1. Press the ON key to turn the calculator on.
2. Press the Y= key. Clear out old equations by pressing CLEAR. Use the arrow keys to scroll between equations.
3. Type your first equation in the row \Y1= . To represent the variable X, press the X,T,θ,*n* key.
4. If you have multiple equations, type them in the subsequent rows \Y2= , \Y3= , etc.

**Step 2: Graph & adjust the window**

1. Press the GRAPH button. You will likely have to adjust the window to see the whole graph or zoom in to the part of the graph you need.
2. To adjust the window, press the WINDOW button. To represent the non-negativity constraints, set Xmin = 0 and Ymin = 0.
3. Adjust the Xmax = and Ymax = as necessary. You can do this by trial and error (pressing the GRAPH button each time you make a change to see if the whole graph showed up on your screen). To make an educated guess, look at the size of the coefficients in your equations. Adjust your Xmax = and Ymax = to be representative of the relative size of these coefficients.
4. You usually do not need to change the Xscl = and the Yscl =. They can be set to Xscl = 1 and Yscl = 1 for equations with relatively small coefficients and Xscl = 10 and Yscl = 10 for equations with large coefficients. This just changes the scale of your graph, or the value of one tick mark.
5. When you can see the whole graph on your screen, including the points where the lines intersect both axes, you are done adjusting the window.

**Step 3: Determine “key points” for accurate graphing**

1. To determine the x- and y-intercepts (and intersections of your lines if you have multiple lines), there are two recommended methods.
	1. Table method: Press the buttons 2nd GRAPH to bring up the table. This gives all of the values Y1 and Y2 of your lines for every corresponding value of X.
		1. To find the y-intercept values, look in the row where X = 0. The corresponding values of Y1 and Y2 are the y-intercept values to use to start your accurately drawing your graph.
		2. To find the x-intercept values, look in the rows where Y1 = 0 and Y2 = 0. The corresponding values of X are your x-intercepts.
		3. The find where the lines intersect one another, look for the row in the table where Y1 and Y2 are the same. This value for Y and the corresponding X value give you the point of intersection.
	2. Trace method: Press the TRACE button. Use the arrow keys to move the blinking cursor to the points for which you want to determine the values. Note: this method is often inaccurate, because the calculator often does not land on the exact points of intersection.
		1. To get the accurate points, press the buttons 2nd TRACE to get to the “CALCULATE” menu.
		2. To calculate the exact value of an x- or y-intercept, select 2: zero. At the first prompt, “Left Bound?,” move your cursor to the left-side of the intercept point you’re trying to find, then press ENTER. At the next prompt, “Right Bound?,” move your cursor to the right-hand side of the intercept point you’re trying to find, then press ENTER. At the last prompt, “Guess?,” again select ENTER. The X and Y values of the Zero (intercept value) are displayed on the screen.
		3. To calculate the exact value of the intersection of two lines, go back to the “CALCULATE” menu by pressing 2nd TRACE. This time, select 5: intersect. At the prompt, “First curve?,” note the equation at the top and screen and press ENTER. At the next prompt, “Second curve?,” make the sure the equation at the top of the screen is for the other line and press ENTER. If not, use the arrow keys to move the cursor to the other line before pressing ENTER. At the third prompt, “Guess?,” press ENTER. The X and Y values of the Intersection are displayed on the screen.
2. Once you determine the (*x, y)* coordinate values of these “key points” on your graph, use them to determine the scale of your graph then accurately draw your graph from these points.
3. Remember, you will need to determine the *feasible region* to shade that satisfies all inequalities (usually the area below all of the lines you graphed).