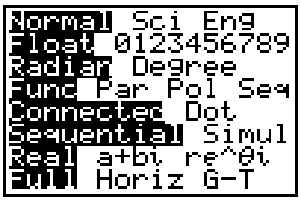
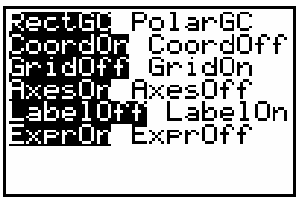
MAT 098 TI-83/84 Basics

General Note:
1. The screen will scratch easily. Avoid running your fingernail or pencil over it. You might consider putting a piece of tape with your name on the calculator. Calculators get stolen regularly!

2. To adjust the screen brightness, press **2nd**, then hold down the up or down arrows .
The brightness will go up or down, and the level is displayed in the upper right hand corner. When the number reads 8 or 9, you should replace the batteries. (AAA batteries)

Getting Started Using the Calculator
1. Your TI-83/84 can be put into several "modes". The most common or "default" modes are shown below. The first set of modes is found by pressing **MODE**, the second by pressing **FORMAT** (2nd ZOOM). Change the settings so that they agree with those below.





2. The basic screen that you do computations on is called the "Homescreen". To clear the Homescreen press **CLEAR**

3. To leave a menu select **CLEAR** or **QUIT** (**2nd MODE**). (CLEAR acts like "escape" on a computer.)

4. The **ENTER** key is like an "=" sign for computations. It is also the key that tells the calculator to *execute* a menu choice.

5. The [^] is the exponent key. Example: 2^3 means 2^3. Press **ENTER** to get 8.

6. The negative sign [(-)] is next to the **ENTER** key. It is *not* the same as the minus [–] key.

Practice: Key in $(-3)^2 - 17$. Press **ENTER** to get the answer.

7. When keying in expressions make liberal use of parentheses. Too many can't hurt as long as they are in the correct position.

Practice: Key in $\frac{4-10}{2+7}$ as (4 - 10)/ (2+7)

Practice: Key in $\frac{6+1}{2(6)}$ as (6 + 1) / (2∗6)

Practice: Key in $\sqrt{2(6+2)}$ as √ (2 (6 + 2))

HOMESCREEN PRACTICE

1. Evaluate the following on your calculator. Try to enter the whole expression on one line. You will have to insert extra parentheses in the fractions.

   a) $4(3-6)$ = _____ b) $-2\,(6+4)$ = _____ c) -5^2 = _____ d) $(-5)^2$ = ____

   e) $\frac{3+5}{2}$ = _____ d) $\frac{3^2-5}{6-2^2}$ = _____ e) $\sqrt{110-10}$ = ____ f) $\sqrt{\frac{1216}{19}}$ = ____

   The answers are: -12, -20, -25, 25, 4, 2, 10, 8. Did you get them right?

2. Enter: $\frac{3}{5}-\frac{13}{7}+\frac{4}{5}$ = _____ *(Note: no need for parentheses on this one, since division comes before adding and subtracting.)*

3. The last answer can be returned to fraction form: Select **MATH > 1:FRAC** then press **ENTER**. What is the fractional form of the answer? _____

4. Find 4^{20} = _____ $\frac{1}{1500}$ = _____

   These last 2 results are displayed in **scientific notation** on your calculator. On the first problem the "1.0099511628E12" stands for $1.099511628 \times 10^{12}$. What does the second calculator output represent? _____

5. To enter a number in scientific notation, use the **EE** key (2nd comma, above the 7). Enter 6.34×10^{12} as 6.34 **EE** 12. *Note: the calculator will display E, not "EE".*
   Then find: $(2.13\times10^{7})(6.15\times10^{11})$ = _____

6. Find π correct to 9 decimal places: $\pi \approx$ _____

7. Evaluate 9(6-3) = _____. To square the result, simple press the $\mathbf{x^2}$ key. Notice that the previous answer of 27 is displayed as ANS. The squared result is : _____

8. Enter the expression 200 - ANS. (ANS is above the (-) key.) The result is _____.

9. Press the following: 10 [STO→] X then **ENTER**. The letter X is on the [X,T,Θ,n] key. On your screen you should see 10→X . The number 10 has been stored into the memory cell called X. Now enter on a new line: $2X^2 + 4X + 5$. Press **ENTER**. The result is _____. Is this correct?

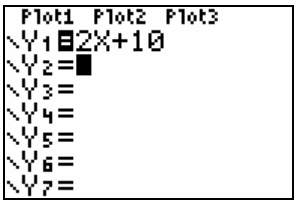
10. Do the following in your head, then check on the calculator. Practice entering the entire line at once, making use of parentheses where necessary. a) $\sqrt{4+5}$ b) $\frac{-2+\sqrt{64}}{3}$.

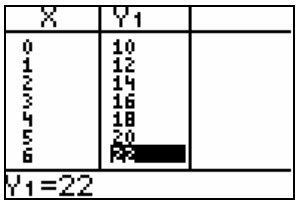
TABLES

You can create tables of values for functions quite easily on the calculator. Press **Y=** and enter an equation such as **Y1=2X+10**. The X is on the [X,T,Θ,n] key, just below the **MODE** key (see below).

Then press the table setup key (TBLSET or 2nd WINDOW) and make **TblStart = 0**, and **ΔTbl = 1.** Keep both Independent and Dependent on "Auto" (see below).

Then press **TABLE (2nd GRAPH)** to view the table (see below). Use the up and down arrows on the keypad to scroll through the table.



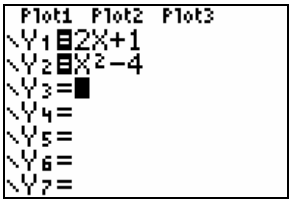


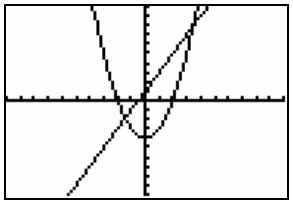
Go back to Y= and enter **Y2 = X^2**. Then go to TBLSET and set **TblStart = 0**, and **ΔTbl = 0.5.** Then press **TABLE**.

Use the table to solve the equation: $x^2 = 240.25$ The solution is $x =$ _____ .

GRAPHS

Equations like $y = 2x + 1$ and $y = x^2 - 4$ can be plotted on your TI-83/84. First enter these equations under **Y=** . Once you have done this, a quick way to see their graphs is to press **ZOOM > #6:ZSTANDARD**. See below.





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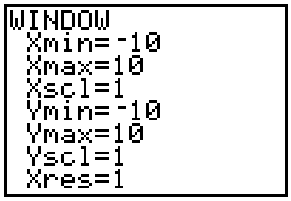
What has Zoom Standard done? To see, press **WINDOW**. (see below)



Zoom Standard sets up a pre-defined viewing window (graph paper) with *x* and *y* both running between –10 and 10. **Xscl** and **Yscl** give the distance between tick marks on the *x* and *y* axes, respectively.

Suppose that we want to just look at the 1st quadrant. Sorry, but there is no pre-defined window—you have to set it up yourself. Edit **WINDOW** as follows: Xmin=0, Xmax = 10, Xscl=1, Ymin=0, Ymax=10, Yscl=1. Now press **GRAPH**.

Problem: Suppose we want to graph the linear function $y = 200 - 25x$. Knowing the intercepts can help you adjust the viewing window so that you get a nice picture of the graph.

Start by finding the x and y intercepts with paper and pencil. You should get: y-intercept = (0, 200) x-intercept = (8, 0). Now choose settings in **WINDOW** so that you can see the *x* and *y* intercepts, and the x and y axes. Some possibilities for the settings are give below. Enter these, then press **GRAPH**.

Xmin = -2 Xmax = 10 Xscl = 1 Ymin = -50 Ymax = 300 Yscl = 50

As it turns out, **finding an appropriate graphing window is one of the more difficult tasks for any user**. So don't get discouraged, you may have to try several times before the window looks "just right". Doing a little detective work (like finding where the intercepts are located) will help you choose **WINDOW** settings that result in a good graph.

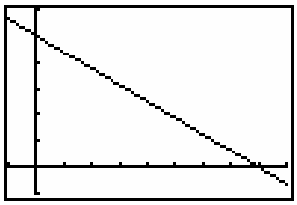
Once you get a graph, press **TRACE** and use the left and right arrow keys to move along the line. Notice that the coordinates where the cursor lands are not too nice (typically with lots of decimal places). The key to making **TRACE** give better coordinates is the following: **make the distance between Xmin and Xmax equal to some fraction of 94** *(this is because there are 94 pixels on the screen going left to right!).*

Example: The x and y intercepts of $y = 200 - 25x$ can be seen in the viewing window with Xmin = 0 and Xmax = 8. Try this.

Now set Xmax = 9.4 (which is a fraction of 94) and press **TRACE**. You could have also set Xmin = -1 and Xmax = 8.4 ---- this keeps the distance between Xmin and Xmax equal to 9.4.

Example: Graph the equation $y = 0.01x^2$. Set Xmin = -47, Xmax = 47, Xscl = 1, Ymin = 0, Ymax = 10 and Yscl = 1. Press **TRACE**. Again, you should get nice trace values, because the distance between Xmin and Xmax is 94.

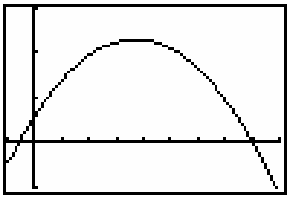
Problem #1 The graph of y = 100–0.5x is displayed below. Determine the window settings to get the same picture on your calculator.



Xmin = _____ Xmax = _____ Xscl = _____

Ymin = _____ Ymax = _____ Yscl = _____

Problem #2 The graph of y = -0.001(x + 15)(x – 200) is displayed below. Determine the window settings to get the same picture on your calculator.



Xmin = _____ Xmax = _____ Xscl = _____

Ymin = _____ Ymax = _____ Yscl = _____