

QUADRATIC FORMULA PROGRAM Name _____

TI-Calculators

This activity will provide instructions and practice using your graphing calculator in yet another way. We will program the quadratic formula so that you can enter the values for a, b, and c and the program will give you the solutions for any quadratic without having to do the steps of the quadratic formula by hand.

The main new key we use is the **PRGM** key found in the 3rd row center of your keypad. The choices from there will be "Prompt" and "Disp" (for display). We will also use the **STO>** key (for store) which is right above the ON key. Programs are automatically saved on your calculator unless you erase it or reset the calculator. This allows you to turn it off and come back later and run the program without having to type it in each time.

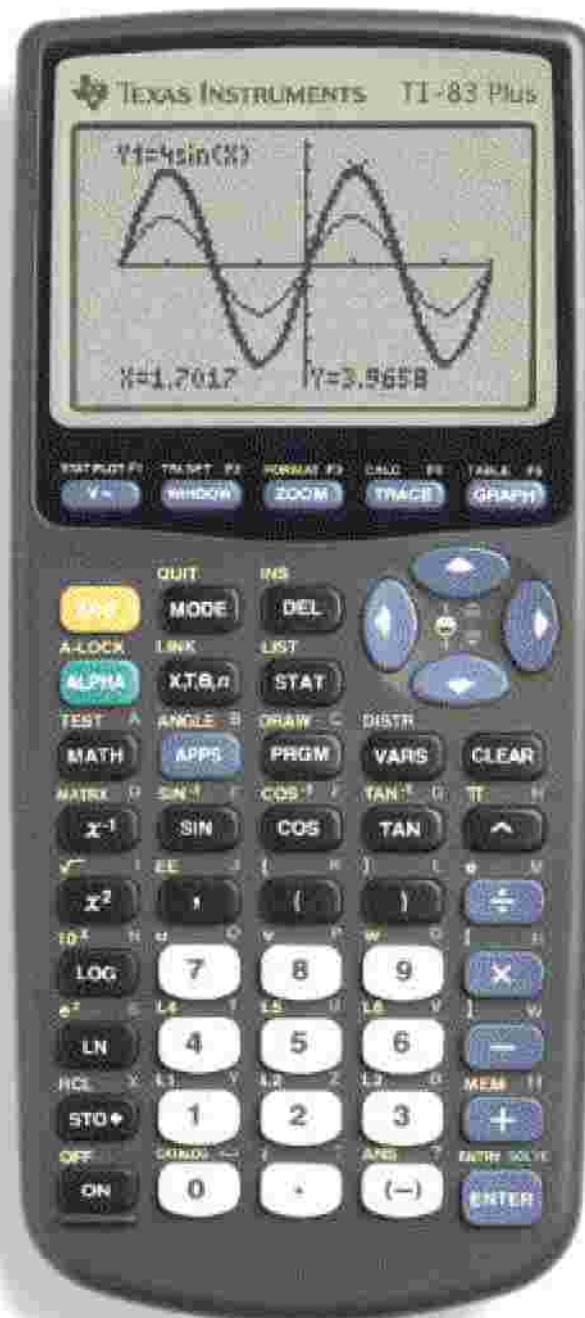
Begin by pressing the **PRGM** key and then use the arrow keys to move the top menu over to NEW. Press 1 for "Create New". After "Name =" type in the letters QF to name our program. Press the ENTER key and you will see a colon (:) which will be at the beginning of each line of code. Listed below are the lines for our QF program.

Code

```
: Prompt A,B,C  
: B2-4AC > D  
: Disp (-B + √(D))/(2A)  
: Disp (-B - √(D))/(2A)  
: Disp "D_IS_" , D
```

Instructions

1. To get Prompt press the **PRGM** key and then use the right arrow key to move over to I/O on the top menu. From there choose 2 (Prompt). Then press the **ALPHA** key and **A**, then the comma key, **ALPHA B**, then comma, and **ALPHA C**. After the **C** press **ENTER** and it will go to the next line.
2. Type in the 2nd line as indicated. After **C** press the **STO >** key then **D**.
3. For lines 3 and 4 start by pressing **PRGM** and then moving over to I/O as done in line 1, but choose number 3 (for Disp). Also be sure that the "-" in front of the B is the (-) key located near the **ENTER** key. In line 4 the "-" after the B is the regular subtract key located above the "+" key. Be sure to put in ALL the parentheses as indicated.
4. The last line needs a space after the "D" and the word "is". The space is found by pressing **ALPHA** and the "0" (zero) keys.
5. When you are done entering the code, press the **2ND** key and **QUIT** (Mode) key. To run the program press **PRGM** and follow the prompts for the values of A,B, and C.



TESTING

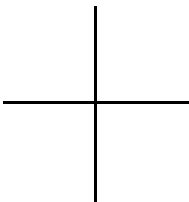
Complete the following problem to test your calculator.: $x^2 - 3x - 10 = 0$. Remember press **PRGM**, choose the number 1 which should be your QF program. Press **ENTER** and when it asks for A, just type the appropriate value for A which is 1 and press **ENTER**. Do the same for the values of B and C. Be sure to use the (-) key for negatives. You should then get the answers which should be: 5 and -2. It should also indicate that D is 49 which is the discriminant.

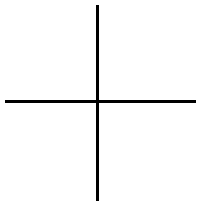
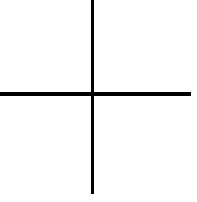
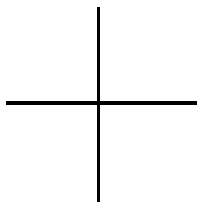
If you got those answers - it is likely that you have coded your program correctly and can use it to solve the problems below. If you did NOT get this, you will need to go back and try to find the error and fix it. When you think you have "repaired" the error, press **2nd QUIT** and try running it again.

 Use the QF Program on your TI-Calculator. Run the program to solve each of these problems. Record the answers.

	Problem	Solutions	Discriminant
1.	$x^2 + x - 30 = 0$	_____	_____
2.	$2x^2 + x - 21 = 0$	_____	_____
3.	$x^2 + 4x + 4 = 0$	_____	_____
4a.	$x^2 - 6x + 10 = 0$	_____	Why did you get this result for this one? What does it mean? (Press 1 for QUIT to precede to the next problem.)

We are now going to change one setting on the calculator to allow it to do problems with imaginary solutions. Press the **MODE** key and scroll down to REAL and then over to **a+bi**. Press **ENTER** so that it is highlighted. Now press **2ND QUIT** and try running the QF program again. We will begin with another look at problem 4 above.

	Problem	Solutions	Discriminant
4b.	$x^2 - 6x + 10 = 0$	_____	_____ Is the solution what you expect for that type of discriminant? Why?
4c.	Use the "y=" key to sketch the graph of 4b.		
4d.	How does the sketch relate to the value of your discriminant?	_____	

5.	$-3x^2 - 6x - 4 = 0$	6.	$0.25x^2 + 0.35x - 0.60 = 0$	7.	$\frac{1}{2}x^2 + 2x - 4 = 0$
					
Solutions: _____		_____		_____	
Discriminant: _____		_____		_____	