The Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

use for finding solutions (roots) to equations of the form:

$$ax^2 + bx + c = 0$$

where a, b, and c are numbers, and $a \neq 0$

- **Solve $x^2 + 3x - 4 = 0$**

This quadratic happens to factor:

$$x^2 + 3x - 4 = (x + 4)(x - 1) = 0$$

...so I already know that the solutions are $x = -4$ and $x = 1$. How would my solution look in the Quadratic Formula? Using $a = 1$, $b = 3$, and $c = -4$, my solution looks like this:

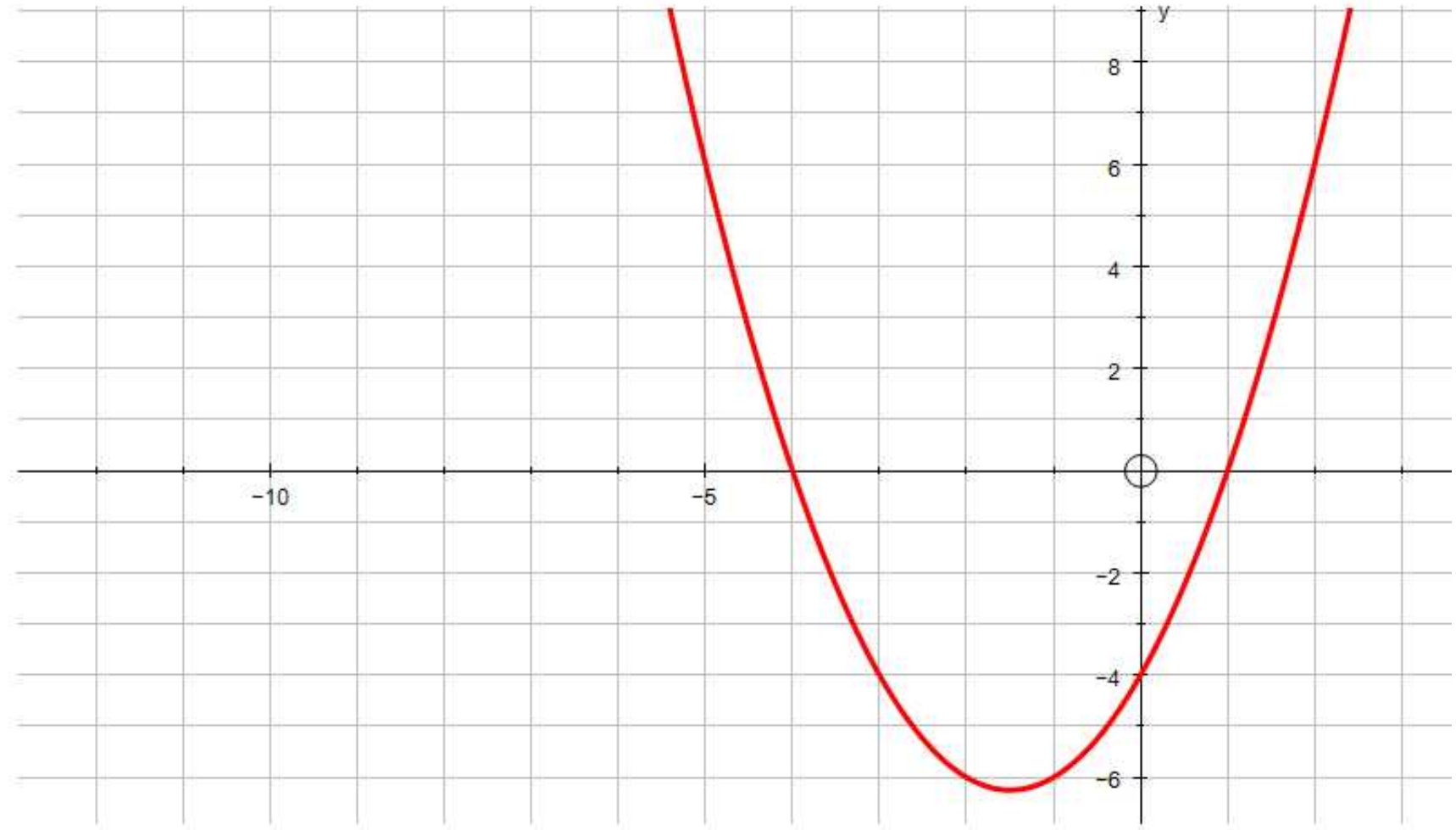
$$x = \frac{-(3) \pm \sqrt{(3)^2 - 4(1)(-4)}}{2(1)}$$

$$= \frac{-3 \pm \sqrt{9+16}}{2} = \frac{-3 \pm \sqrt{25}}{2}$$

$$= \frac{-3 \pm 5}{2} = \frac{-3-5}{2}, \frac{-3+5}{2}$$

$$= \frac{-8}{2}, \frac{2}{2} = -4, 1 = x$$

Then, as expected, the solution is $x = -4, x = 1$.



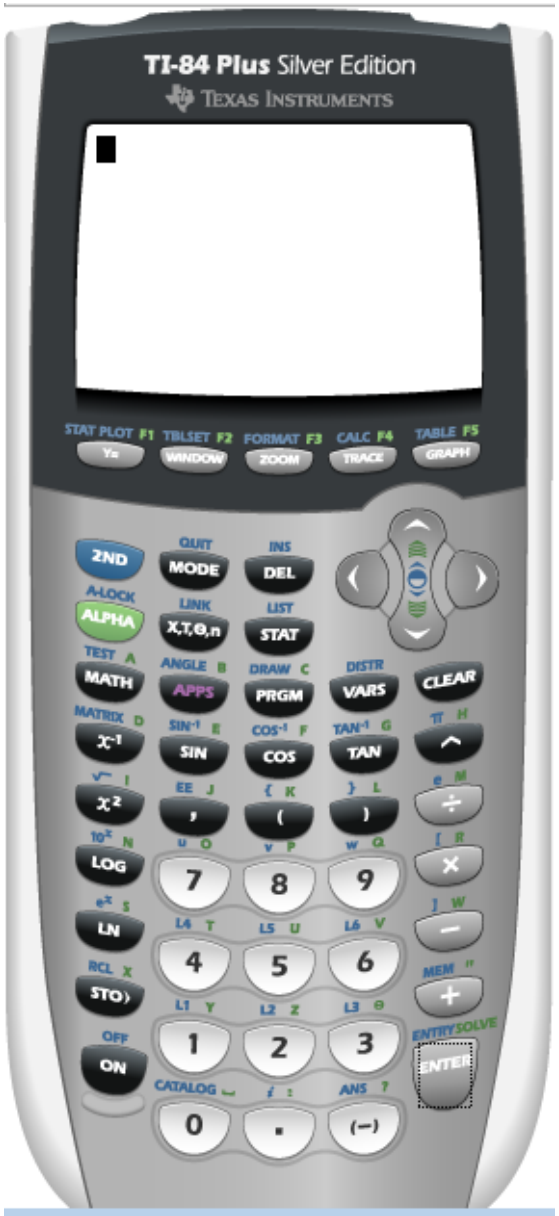
Example 1: y = ax^2 + x3 − 4

Steps for solving a quadratic equation

?

1) Identify a value for a
2) Identify a value for b
3) Identify a value of c
4) calculate $b^2 - 4ac$
5) calculate $\frac{-b + \sqrt{(b^2 - 4ac)}}{2a}$
6) calculate $\frac{-b - \sqrt{(b^2 - 4ac)}}{2a}$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$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Texas Instruments
STAT PLOT F1 TBLSET F2 FORMAT F3 CALC F4 TABLE F5
Y= WINDOW ZOOM TRACE GRAPH
2ND MODE DEL
ALPHA X,T,Θ,n STAT
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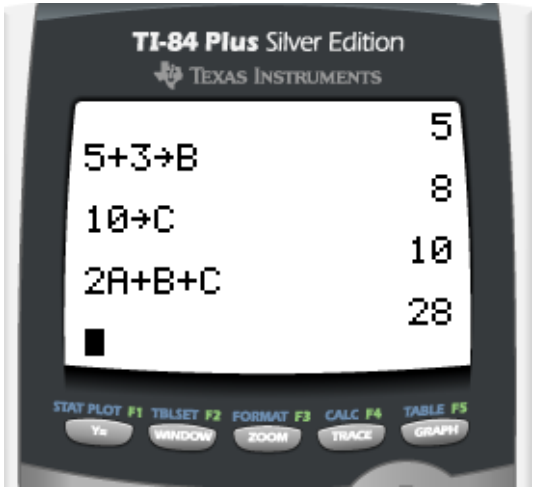
TI-84 Plus Silver Edition
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5+3→B
5
8
10→C
10
2A+B+C
28
STAT PLOT F1 TBLSET F2 FORMAT F3 CALC F4 TABLE F5
Y= WINDOW ZOOM TRACE GRAPH


5→A
5
5+3→B
8
10→C
10


TI-84 Plus Silver Edition
Texas Instruments
STAT PLOT F1 TBLSET F2 FORMAT F3 CALC F4 TABLE F5
Y= WINDOW ZOOM TRACE GRAPH
2ND QUIT INS
MODE DEL
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ALPHA X,T,θ,n STAT
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MATH APPS PRGM VARS CLEAR
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TEST A
MATH
ANGLE B
APPS
DRAW C
PRGM
DISTR
VARS
CLEAR
MATRIX D
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RCL X
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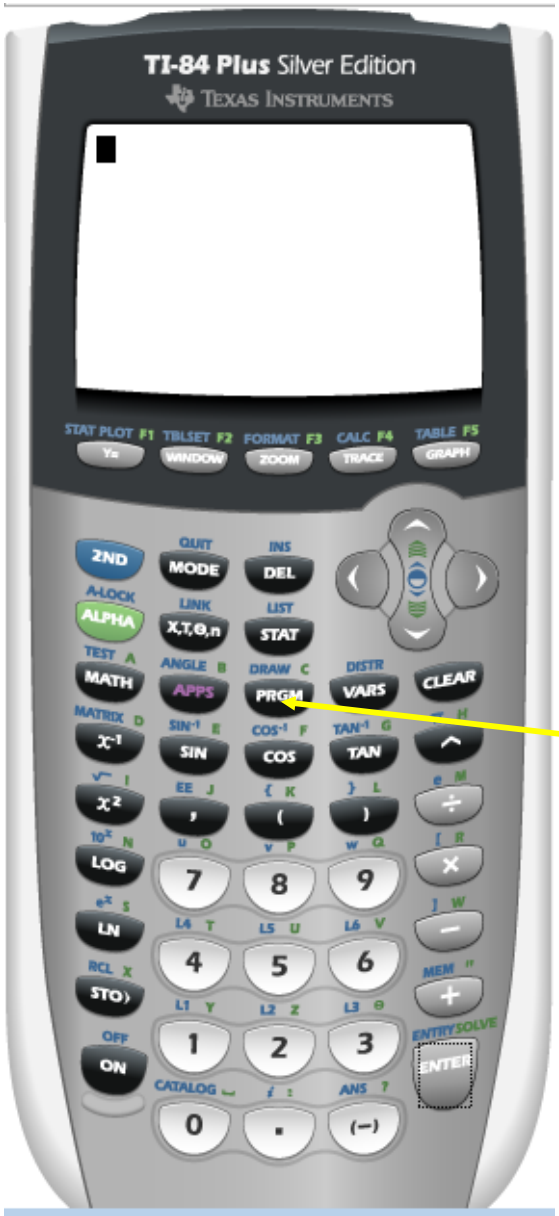
TI-84 Plus Silver Edition
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STAT PLOT F1 TBLSET F2 FORMAT F3 CALC F4 TABLE F5
Y= WINDOW ZOOM TRACE GRAPH
2ND QUIT MODE INS DEL
A-LOCK ALPHA LINK X,T,θ,n LIST STAT
TEST A MATH ANGLE B APPS DRAW C PRGM DISTR VARS CLEAR
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x² EE J , { K (} L)
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e^ S LN L4 T 4 L5 U 5 L6 V 6
RCL X STO→ L1 Y 1 L2 Z 2 L3 Θ 3
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EXEC EDIT NEW
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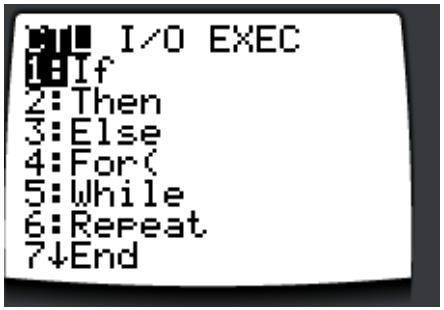
STAT PLOT F1 TBLSET F2 FORMAT F3 CALC F4 TABLE F5
Y= WINDOW ZOOM TRACE GRAPH

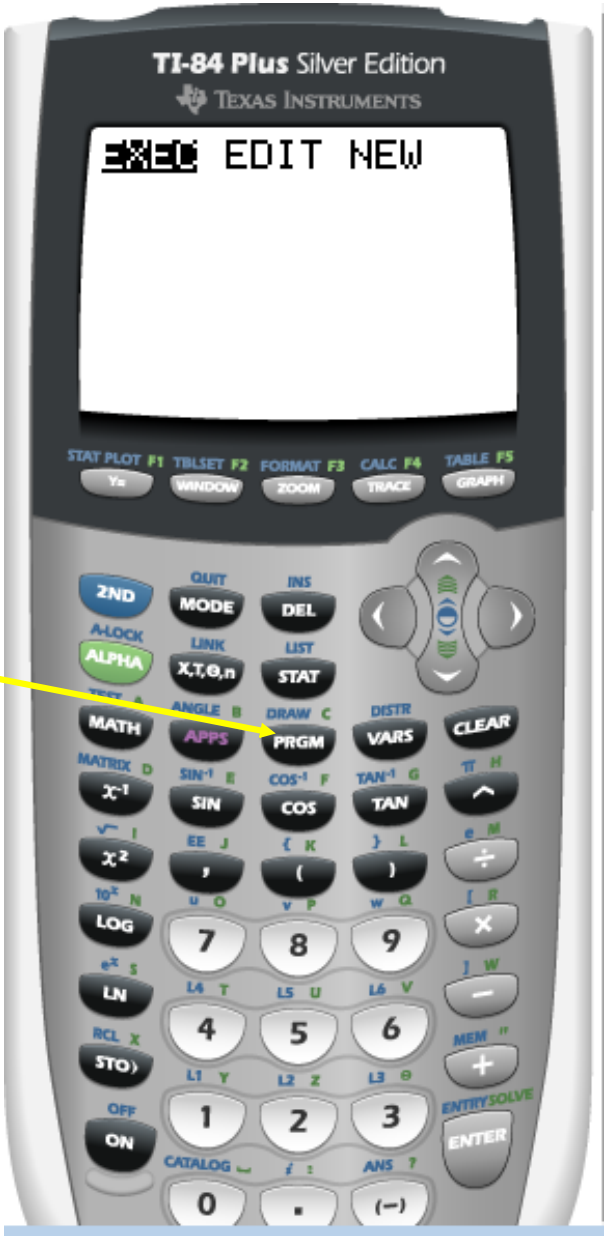

CTL I/O EXEC
1:If
2:Then
3:Else
4:For(
5:While
6:Repeat
7↓End


PRGM


CTL I/O EXEC
1:Input
2:Prompt
3:Disp
4:DispGraph
5:DispTable
6:Output(
7↓getKey


CTL I/O EXEC
1:QUAD1


DRAW C
PRGM


TI-84 Plus Silver Edition
Texas Instruments
EDIT NEW
STAT PLOT F1
TBLSET F2
FORMAT F3
CALC F4
TABLE F5
Y=
WINDOW
ZOOM
TRACE
GRAPH
2ND
QUIT
INS
MODE
DEL
A-LOCK
ALPHA
LINK
X,T,θ,n
LIST
STAT
MATH
ANGLE B
APPS
DRAW C
PRGM
DISTR
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MATRIX D
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PROGRAM:QUAD1
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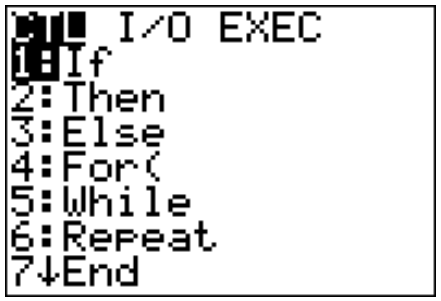
CTL I/O EXEC
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6:Repeat
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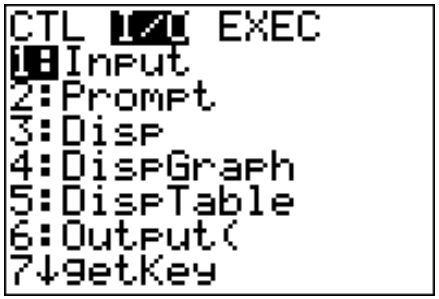
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CTL I/O EXEC
1:QUAD1