The Casio FX 115ES Calculator and Orders of Operation



x2

SHIFT

FRACTION

ARROWS

PARENTHESIS

The calculator always uses the correct orders of operation.

You need to ensure that what you are inputting is correct.

* Simplify the following expression without using the calculator and then input it into your calculator to see if you have the same answer.

16 $÷$ 8 x 2 =

The calculator will give an answer of 4. If you multiplied before dividing you have an answer of 1.

Remember multiplication and division are done in order from left to right. Since the division comes first, you should divide first and then multiply. This is why it is very important to input the problem correctly. It you wanted to multiply first you need to input the expression with parenthesis such as

16 $÷$ (8 x 2) =. It is very important to place grouping symbols where appropriate.

To simplify the expression $\frac{56-4(20-13)}{(2+6)^{2}-2(37-6)}$, there are two options.

1st – input the expression as a single line using $÷$ in place of the fraction bar and ensuring that the numerator and denominator are both in parenthesis:

**(**56 – 4(20 – 13) **)**$ ÷$ **(** (2+6) x2 -2(37-6) **) =**

**Your screen should look like:** (56-4(20-13)) $÷$ ((2+6)2-2(37-6)) 14

2nd – input the expression as the fraction:

$\frac{∎}{}$ 56 – 4(20 – 13) down arrow (2+6) x2 -2(37-6) **=**

**Your screen should look like:** $\frac{56-4(20-13)}{(2+6)^{2}-2(37-6)}$ 14

Using Orders of Operation in Formulas



$$\sqrt{}$$

x2

SHIFT

FRACTION

ARROWS

(-)

S⬄D

The orders of operation become important when substituting values into a formula.

1. Quadratic formula: $\frac{-b \pm \sqrt{b^{2}-4ac}}{2a}$; solve 4x2 + 5x – 3 = 0 using the quadratic formula

* (a = 4; b = 5; c = -3) hence you need to input the following expression: $\frac{-5 \pm \sqrt{5^{2}-4(4)(-3)}}{2(4)}$,

(NOTE: you can only compute one value at a time, so begin with the positive root.)

* Use the fraction button to create the fraction. $\frac{∎}{}$
* Input the entire numerator: (-) 5 + $\sqrt{∎}$ 5 x2 – 4 x 4 x (-) 3 **DO NOT PRESS =**

**Your screen should look like:**  $\frac{-5+\sqrt{5^{2}-4×4×-3}}{∎}$

* Now input the denominator by first pressing the down arrow so that the cursor is in the denominator. Input 2 x 4 and press **=**

 **Your screen should look like:**  $\frac{-5+\sqrt{5^{2}-4×4×-3}}{2×4}$ $\frac{-5+\sqrt{73}}{8}$

This is the exact value. If you want a decimal approximation, use S⬄D

**Your screen should look like:**  $\frac{-5+\sqrt{5^{2}-4×4×-3}}{2×4}$ 0.4430004682

Whenever you want to reenter the previous expression to make a simple change,

press the right arrow key and the previous expression will appear on the screen.

To calculate the other root, the sign before the square root in the previous expression

is the only entry that needs to be changed.



$$\sqrt{}$$

x2

SHIFT

FRACTION

ARROWS

(-)

S⬄D

* Press the right arrow to access the previous expression. Using the arrow keys move the cursor past the + and hit DEL. This removes the + and the – can now be input. (Be sure that you use the subtraction button and not the (-) button.)

**Your screen should look like:**  $\frac{-5-\sqrt{5^{2}-4×4×-3}}{2×4}$ $-\frac{5+\sqrt{73}}{8}$

At first glance this may look like the same value as before, however your calculator has factored the negative out of both the 5 and the square root and placed it in front of the entire fraction.

This is the exact value. If you want a decimal approximation, use S⬄D

**Your screen should look like:**  $\frac{-5-\sqrt{5^{2}-4×4×-3}}{2×4}$ -1.693000468