The Casio FX 115ES Calculator and Scientific notation

These are the buttons we will be using to calculate in scientific notation.

ARROW KEYS



S⬄D

SHIFT

FRACTION

SETUP

(-)

x10x

We will be using the x10x button to input the numbers in scientific notation.

* Inputing values in scientific notation: input the number, press x10x input the power press =.

Input 3.24 x 106: 3.24 x10x 6 =

**You screen should look like this: 3.24X106**3240000

Input 4.65 x 10-4: 4.65 x10x (-) 4 =

**You screen should look like this: 4.65X10-4**$\frac{93}{200000}$

If you are working entirely in scientific notation, begin by setting the calculator into scientific mode.

* Press: Shift; Set up and press 7

1: Mth IO 2: Line IO

3: Deg 4: Rad

5: Gra 6: Fix

7: Sci 8: Norm

The screen now shows: Sci 0~9? This is asking for the number of significant figures you need in your answer. For this worksheet, press 3. The calculator will go to the home screen and we are now ready to input the expressions.



x10x

(-)

FRACTION

Sceintific notation is used when dealing with very large and very small numbers in applications.

The volume of a sphere is given by the formula:$\frac{4}{3}πr^{3}$**.**

1. Given the radius of the Earth is 6.30x106 meters, finded its volume.

* Input the fraction $\frac{4}{3}$ type 4, by pressing the fraction key $\frac{∎}{}$ and type 3. Use the right arrow to move the curser out of the denominator.

**The screen should look like this:** $\frac{4}{3}|$**.**

* Now press Shift and the x10x to access $π$.

**You screen should look like this:** $\frac{4}{3}π$

* Now input ( 6.30 x10x 6 ) Shift x2 =

**You screen should look like this:** $\frac{4}{3}π$**(6.30X106)3** 1.05 x1021

2. Given that the radius of the sun is 6.96 X 108, find the volume of the sun.

* Input: 4 $\frac{∎}{}$ 3 RIGHT ARROW Shift x10x ( 6.96 x10x 8 ) Shift x2 =

**You screen should look like this:** $\frac{4}{3}π$**(6.96X108)3** 1.41 x1027

3. How many earths will fit into the sun? This requires the volume of the sun to be divided by the volume of the earth.

* Input: 1.41 x10x 27 $÷$ 1.05 x10x 21 =

**You screen should look like this: 1.41x1027**$÷$**1.05 x1021**1.34 x106

When working with very small amounts like the mass of a water moecule which is 3.00 X 10-26, negative numbers are used in the exponent.

1. The total mass of the earth is 5.98 X 1024 kilograms and about 0.023% of the earth is water. If the mass of one water molecule is 3.00 X 10-26 kilograms, how many water molecules are there on the earth?

* First find the amount of water on the earth and then divide by the size of one water molecule.

 Input: 5.98 **x10x** 24 X 0.023 SHIFT ( X $÷ $3.00 **x10x** (-) 26 =

**You screen should look like this: 5.98x1024 x 0.033%** $÷ $ **3.00x10-26**  **6.58x1046**

The gravitaional pull between two bodies is given by the formula F = G $\frac{M\_{1}M\_{2}}{d^{2}}$

1. To calculate the forces between the sun and the earth, G = 6.67 X 10-11 $^{Nm^{2}}/\_{kg^{2}}$;

 Msun = 2 X 1030 kg; Mearth = 5.97 X 1024kg; d = 1.496 X 1011m, hence:

F = 6.67 X 10-11  $\frac{\left(2 X 10^{30}\right) \left(5.97 X 10^{24}\right)}{(1.496 X 10^{11})^{2}}$

* Input 6.67 **x10x** (-) 11 X $\frac{∎}{}$ (2 **x10x** 30 ) ( 5.97 **x10x** 24 ) DOWN ARROW (1.496 **x10x** 11) x2 =

**You screen should look like this:** note that the exponents on the 10 are not written as usual exponents.

6.67$×$10 -11$×\frac{\left(2 × 10 30\right) \left(5.97 × 10 24\right)}{\left(1.496 × 10 8\right)^{2}}$ 3.56$×$1022

Be sure to put your calculator back into normal mode by using Shift; Set up and press 8 and press 1. This will put the calculator back into standard mode.