

## Basic Skills

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### Scientific Notation

#### Example 1

Use a calculator to evaluate each expression:

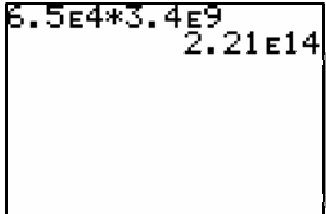
- (a)  $65,000 \times 3,400,000,000$
- (b)  $.000000348 \div 870$

Solutions:

- (a) Rewrite as "6.5 E 4" and "3.4 E 9"

Push 6.5  $\boxed{2^{nd}}$   $\boxed{,}$  4  $\boxed{\times}$  3.4  $\boxed{2^{nd}}$   $\boxed{,}$  9  $\boxed{=}$

This implies that  $65000 \times 3400000000 = 2.21 \text{ E } 14 = 221,000,000,000,000$

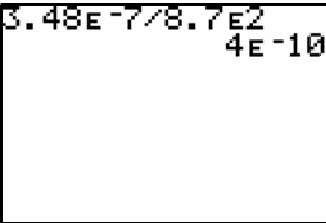


6.5E4\*3.4E9  
2.21E14

- (b) Rewrite as "3.48 E -7" and "8.7 E 2"

Push 3.48  $\boxed{2^{nd}}$   $\boxed{,}$   $\boxed{(-)}$  7  $\boxed{\div}$  8.7  $\boxed{2^{nd}}$   $\boxed{,}$  2  $\boxed{=}$

This implies that  $.000000348 \div 870 = 4 \text{ E } -10 = .0000000004$



3.48E-7/8.7E2  
4E-10

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#### Example (2)

Evaluate the following expression by hand and then use scientific notation on the calculator to check your answer.

$$\frac{(2,400,000,000)(.0000045)}{(.00003)(1500)}$$

By Hand:

On Calculator:  $(2.4\text{E}9 \times 4.5\text{E}-6) / (3\text{E}-5 \times 1.5\text{E}3) = ?$

$$\text{So, } \frac{(2,400,000,000)(.0000045)}{(000003)(1500)} = 240,000 = 2.4 \times 10^5$$

(2.4E9\*4.5E-6)/(3E-5\*1.5E3)  
240000

## Exponents/Roots/Absolute Value

### Exponents (^) and $x^2$

(a)  $3^4$

(b)  $4^2$

(c)  $\left(\frac{1}{2}\right)^2$

### Roots

(a)  $\sqrt{9}$   
 $\boxed{2^{\text{nd}}}$   $\boxed{x^2}$   $\boxed{9}$   $\boxed{=}$

(b)  $\sqrt[3]{27}$   
 $\boxed{\text{Math}}$   $\boxed{\#4}$   $\boxed{27}$   $\boxed{=}$

(c)  $\sqrt[4]{16}$   
 $\boxed{4}$   $\boxed{\text{Math}}$   $\boxed{\#5}$   $\boxed{16}$   $\boxed{=}$

### Absolute value

(a)  $|-3|$   
 $\boxed{\text{Math}}$   $\boxed{\text{Num}}$   $\boxed{\#1\text{abs}}$   $\boxed{-3}$   $\boxed{=}$

(b)  $|7|$   
 $\boxed{\text{Math}}$   $\boxed{\text{Num}}$   $\boxed{\#1\text{abs}}$   $\boxed{7}$   $\boxed{=}$

## Fixing Syntax Errors

Syntax error is when you might enter something on the calculator in the wrong order or some kind of typo. Here are some examples of common errors:

1. Using subtraction instead of (-)
2. Using multiplication instead of  $\boxed{\times, \text{T}, \ominus}$
3. Hitting the same button twice

When a syntax error occurs, the best way to resolve the problem is to choose option #2 GOTO and the calculator will place the cursor where the error is occurring. This will allow you to find and correct the error quickly.

Example (1) Graph the horizontal line  $y = -5$

Under the  $y$  editor, hit the subtraction button, 5 and graph. You will find yourself looking at the screen at the right:



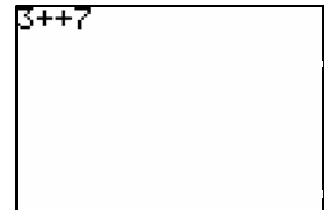
Choose option 2 and the cursor will direct you where the problem lies.

Notice that the cursor is flashing on the subtraction sign. Change the subtraction sign to a negative (-) and then try to graph. What happens?

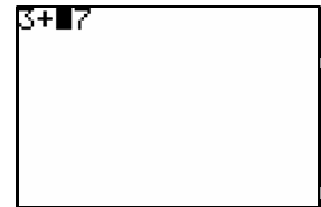


Example (2) On your home screen, type the following:

3+ + 7 and enter. You will get a syntax error. Choose option #2 GOTO and notice where the cursor is flashing.



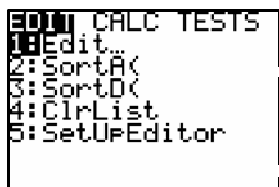
Again, the cursor shows you where the error is.



## Creating a Scatter Plot

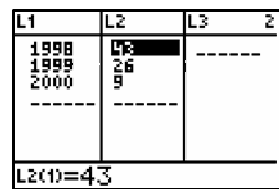
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A scatter plot is a graph of data points. To graph the data, we must first enter our data ( $x$  and  $y$  values) into the calculator. We enter these values into lists. So, first we must become familiar with using lists.



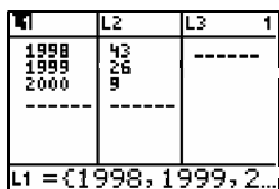
To access the lists:

Press the `stat` button and choose #1, edit. You will see the following screen.



The values that are in these two lists might vary from the lists on your calculator.

To clear a list, use the arrow buttons to move the cursor on L1 (or whichever list you want to clear) and press `clear` `enter`.



DO NOT press delete when on the name of the list. This will delete the list rather than clear the column. If you do accidentally delete a list, hit `stat` `#5` `enter`.

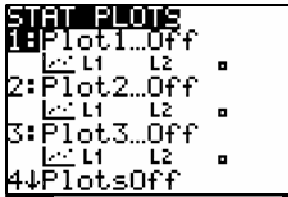
Entering data in a list:

Typically (but not always) L1 is used for  $x$  values and L2 is used for  $y$  values.

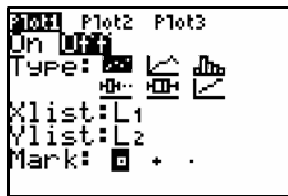
$x$	-4	-3	-2	-1	0	1	2	3	4
$y$	-1	.5	3	7	-5	8	2	0	4.5

Once you clear L1 and L2, place the cursor in the L1 column and type in the first  $x$  value, -4, and hit `enter`. Continue this procedure until all  $x$  values are entered. Then move the cursor to the L2 column and do the same to enter the  $y$  values. When you are done entering the data you wish to plot, you should be able to see all the values in the list.

Before we try to plot the data, we need to make sure the scatterplot is set up properly. To get to the set-up screen press `2nd` `Y=`.

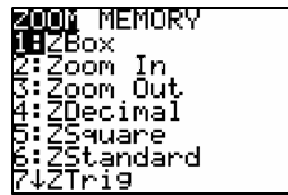


Notice that there are three possible plots. Since we are plotting one set of data, we only need to use one plot. Only one plot should be turned on. Let's use plot #1. Press **enter** on plot #1.

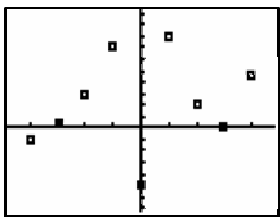


Be sure to turn the plot on by pressing **enter** while the cursor is blinking on ON.

You can choose the type of graph to plot under type. The first choice represents a scatterplot. Make sure that L1 represents the x values and L2 represents the y values. Lastly, you can customize your graph by choosing what symbol you prefer to represent the points.



Once you have the set up complete, hit the **Zoom** button and choose option **9:ZoomSTAT**. This will automatically set your window and graph. If you want to set the window manually, hit the **Window** button instead of **Zoom**, choose the min and max values and hit **graph**.



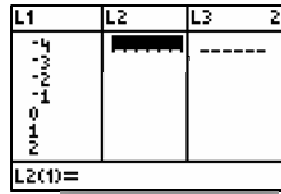
In Summary, it is a 3 step process to create a scatterplot on your graphing calculator.

1. Tell the calculator which points to plot. **stat** **1:edit**
2. Tell the calculator to draw the points. **2<sup>nd</sup>** **Y=**
3. Look at the points. **Zoom** **9:ZoomSTAT**

Common Errors:

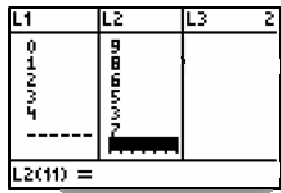
1. ERR: INVALID DIM
2. ERR: DIM MISMATCH

If you forget to put in either x values, y values, or both you will receive ERR: INVALID DIM message.



```
ERR:INVALID DIM
1 Quit
```

If you miss a value when entering the data, you will not have the same number of values in L1 as in L2. You will then receive ERR: DIM MISMATCH message.



```
ERR:DIM MISMATCH
1 Quit
```

Example (2) Create a scatterplot using the data below.

x	-2	-1	0	1	2	3
y	3.7	1.2	.4	1.5	4.3	9.1

Example (3) Create a scatterplot using the data below.

X	-4	-2	2	3
y	-2	-1	1	3