

Scattergrams on the Calculator

The calculator can work with ordered pairs in two main ways:

1. If you put a formula in the $\boxed{Y=}$ screen, the calculator can generate ordered pairs and display them on a *GRAPH* or in a *TABLE*.

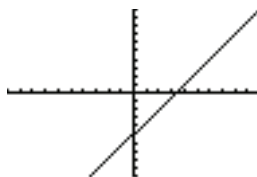
For example, to generate ordered pair solutions to an equation like $y = \frac{3}{2}x - 5$, first press the $\boxed{Y=}$ button, then $\boxed{\text{CLEAR}}$ any formulas that were left over from a previous problem, then type $\boxed{3} \boxed{\div} \boxed{2} \boxed{X,T,\theta, n} \boxed{-} \boxed{5}$. The screen should look like the following:

```

Plot1 Plot2 Plot3
Y1=3/2X-5
Y2=
Y3=
Y4=
Y5=
Y6=
Y7=

```

- (a) To see the graph, press $\boxed{\text{ZOOM}} \boxed{6}$. The screen should look like:



- (b) We have seen how to get the calculator to *ASK* for x -values on a table, but it can also be set to *AUTOMATICALLY* pick x -values in a preset pattern and automatically generate a table.

With $y = \frac{3}{2}x - 5$ still in the $\boxed{Y=}$ screen, press $\boxed{2ND} \boxed{\text{TBLSET}}$, and then move the cursor to “Auto” on the Indpnt line and press $\boxed{\text{ENTER}}$ to make sure it is highlighted. The bottom two lines on the screen should look as they do here:

```

TABLE SETUP
TblStart=50
ΔTbl=.3
Indpnt: Auto Ask
Depend: Auto Ask

```

Now we need to tell it the pattern that we want for the x -values. Let's try having x start at 0 and go by 1s. To do this, have TblStart= 0 and Δ Tbl= 1. The whole screen should look like this:

```
TABLE SETUP
TblStart=0
ΔTbl=1
Indent: Auto Ask
Depend: Auto Ask
```

Now press 2NDTABLE, and the screen should look like:

X	Y ₁	
0	-5	
1	-3.5	
2	-2	
3	-0.5	
4	1	
5	2.5	
6	4	

X=0

Not bad! Notice, however, that since we didn't think about the 2 in the fraction $\frac{3}{2}$, some of the y -values aren't integers. They aren't too bad since 2 isn't too hard a denominator to work with, but if we want only "nice" output values, we need the table to go by 2 instead of by 1. Go back and make Δ Tbl= 2. Then your TABLE screen should look like:

X	Y ₁	
0	-5	
2	-2	
4	1	
6	4	
8	7	
10	10	
12	13	

X=0

What happens if you press the up or down arrows on the calculator while in the TABLE screen?

2. The other way that the calculator can work with ordered pairs is if you manually put them in lists. Then the calculator can plot the individual points using a **STAT PLOT**.

Suppose you want to see the following ordered pairs on a calculator scattergram:

x	-2	-1	0	1	2	3
y	5	6	2	1	-3	-5

- (a) Press **[STAT]**-**[1]** to bring you to the list editor. If there are already values in L_1 and/or L_2 , you should *clear* the list values by moving the cursor up onto the name of the list (the L_1 for example) and press **[CLEAR]**-**[ENTER]**. Make sure you press **[CLEAR]** and NOT **[DEL]**!! If you *delete* a list, or don't see L_1 and/or L_2 at all, come and see me and I'll fix it for you.

After clearing your lists your screen should look like:

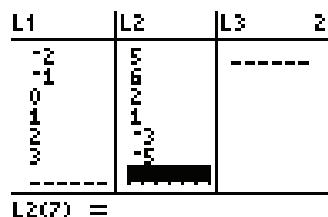
L1	L2	L3	1
██████	-----	-----	
L1() =			

L1	L2	L3	Z
-2	5		
-1	6		
0	2		-----
1	1		
2	3		
3	4		
-----	-----		

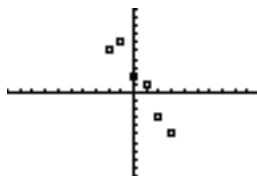
L2(Z) =

- (b) Press **Y=**. Notice that above the equations are three words: Plot1, Plot2, and Plot3. To tell the calculator to plot your lists, turn Plot1 on by moving the cursor onto it and pressing **ENTER**. Since we won't be looking at the graph of an equation, **CLEAR** any formulas you have. Next we have to make sure the STAT PLOT is configured correctly.

Press **2ND**-**STAT PLOT**. The word "On" should be highlighted, because you just turned it on. Make sure the first of the six graph types is selected. You want to have L₁ as the *x*-list, and L₂ as the *y*-list. If they are not already set that way, put the cursor on the *x*-list line and press **2ND**-**L₁**. Similarly, put L₂ in the *y*-list. Your **STAT PLOT** screen should look like this:



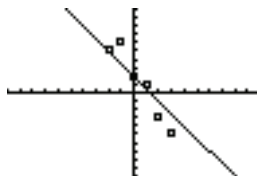
Now, press **zoom**-**6** and you should see the following:



Looking at the data, we can see that a reasonable model could be obtained by using the ordered pairs $(-2, 5)$ and $(0, 2)$. This is great, since we have the *y*-intercept so then the $b = 2$ is given! To get the slope, we use the formula:

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{2 - 5}{0 - (-2)} = \frac{-3}{2} = -\frac{3}{2}$$

giving us the equation $y = -\frac{3}{2}x + 2$. Plugging that into the **Y=** screen and pressing **GRAPH**, we obtain the following:



Hm...not terrible, but it seems like the line isn't steep enough. Play with changing the slope (try using decimals...right now the slope is -1.5) to make a better fit!