



ALGEBRA I ACTIVITY 13: UNDERSTANDING SOLUTIONS OF SYSTEMS USING TABLES AND GRAPHS

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ACTIVITY OVERVIEW:

In this activity we will

- Enter two linear equations in Y1 and Y2
- Examine the graph and tables to identify where they two equations are equal to find the solution to the system

```
Plot1 Plot2 Plot3
Y1 =
Y2 =
Y3 =
Y4 =
Y5 =
Y6 =
Y7 =
```

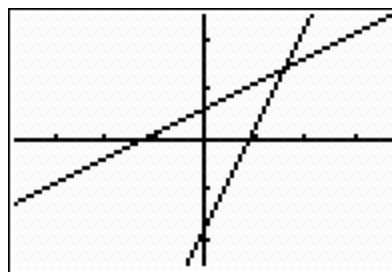
Press $\boxed{Y=}$. Enter the equations for the two lines as shown.

```
Plot1 Plot2 Plot3
Y1 = 3+0.5X
Y2 = -9+2X
Y3 =
Y4 =
Y5 =
Y6 =
Y7 =
```

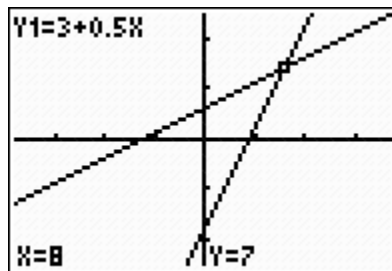
Press \boxed{WINDOW} . Set the window as shown.
*NOTE: This is a friendly window that gives nice decimals when tracing functions. Because of the dimensions of the graphing screen, a friendly window can be obtained by making the Xmin and Xmax multiples of 4.7 and the Ymin and Ymax multiples of 3.1.

```
WINDOW
Xmin=-18.8
Xmax=18.8
Xscl=5
Ymin=-12.4
Ymax=12.4
Yscl=5
Xres=1
```

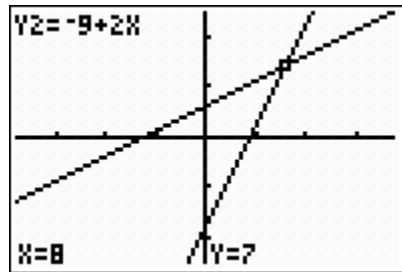
Press \boxed{GRAPH} . The solution to this system occurs where the two equations are equal. Where does it appear that this occurs?



Press \boxed{TRACE} . You will be tracing on the function in Y1, as indicated in the top left corner of the screen. Use the arrows to move the cursor to the point where the two lines intersect. *NOTE: You will notice that the x-values change by 2-tenths as you move the cursor. It appears that the two lines intersect at the point (8, 7).



Press \square . This will move your cursor to trace on the function in Y2. What does it mean that the point (8, 7) also exists on this function?



Next examine the table. Press 2^{nd} GRAPH. Arrow down to find the x-value that gives the same y-value for both functions. This point, (8, 7), is the solution to this system of linear equations.

X	Y1	Y2
3	4.5	-3
4	5.5	-1
5	6.5	1
6	7.5	3
7	8.5	5
8	9.5	7
9	10.5	9

X=8

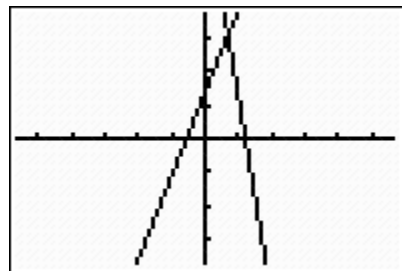
Examine the system of the two equations shown here.

Plot1	Plot2	Plot3
Y1	7+2.5X	
Y2	35.9-6X	
Y3	=	
Y4	=	
Y5	=	
Y6	=	
Y7	=	

Set this friendly window. Later you can explore setting the best friendly window for a certain system.

WINDOW	
Xmin	-28.2
Xmax	28.2
Xscl	5
Ymin	-18.6
Ymax	18.6
Yscl	5
Xres	1

View the graph. Estimate where the solution occurs.



Next examine the table. This time you will notice that no x-value gives the same y-value for both functions. However, what happens between $x=3$ and $x=4$?

X	Y1	Y2
0	7	35.9
1	9.5	29.9
2	12	23.9
3	14.5	17.9
4	17	11.9
5	19.5	5.9
6	22	-1.1

X=3

It is possible to “zoom in” on this section of the table. Press 2nd WINDOW . To examine the part of the table between 3 and 4, change the **TblStart** to 3. You need to count by a smaller amount than 1. Try changing the **ΔTbl** (change in table) to 0.1.

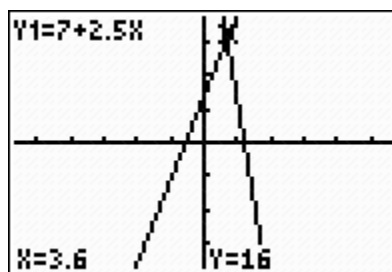
```
TABLE SETUP
TblStart=3
 $\Delta\text{Tbl}$ =.1
IndPnt:  Ask
Depend:  Ask
```

Press 2nd GRAPH to return to the table. Notice that the top value of x is 3 and x increases by 0.1 in each row. Do you see an x-value that gives the same y-value in each function?

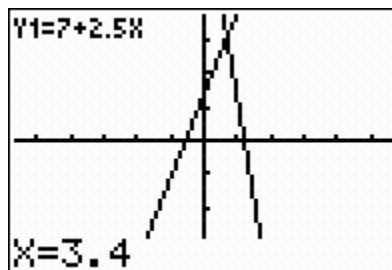
X	Y ₁	Y ₂
3	14.5	17.9
3.1	14.75	17.3
3.2	15	16.7
3.3	15.25	16.1
3.4	15.5	15.5
3.5	15.75	14.9
3.6	16	14.3

X=3.4

Press GRAPH and TRACE . If you trace you will not be able to land exactly on $x=3.4$.



Since you know $x=3.4$ is the desired point, you can type $\text{3}.\text{4}$ ENTER while in trace mode to jump exactly to that value of x.



Try other systems, like $y = 2x + 7$ and $y = -3 + 2x$. You can also examine systems that include a function that is not linear.

