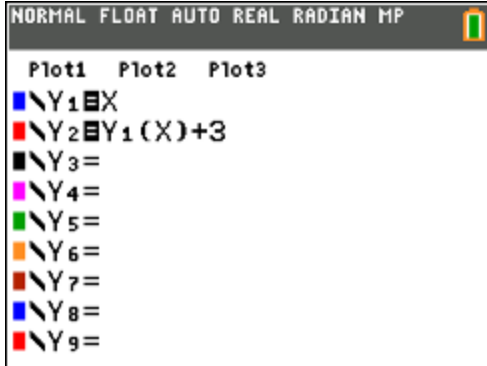


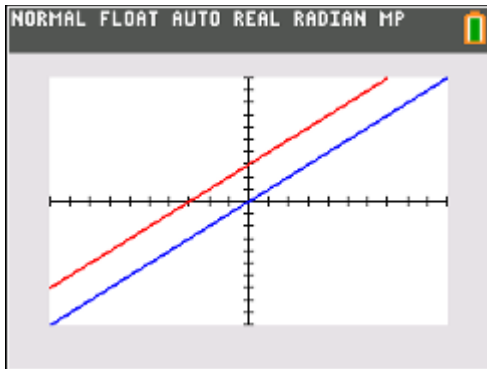
Exploring transformations with the TI-84 Plus CE graphing calculator  
 Dr. Richard Parr (rparr@rice.edu)  
 Rice University School Mathematics Project (<http://rusmp.rice.edu>)



Compare the graphs and tables of  $Y_1 = X$  and  $Y_2 = Y_1(X) + 3$ . What is the function that is being graphed in  $Y_2$ ?

How are the graphs the same?

How are the graphs different?



Compare the tables.  
 What do you notice?

Change the value of 3. Try positive and negative numbers.  
 What do you notice in the tables and graphs?

NORMAL FLOAT AUTO REAL RADIAN MP

PRESS + FOR  $\Delta$ Tb1

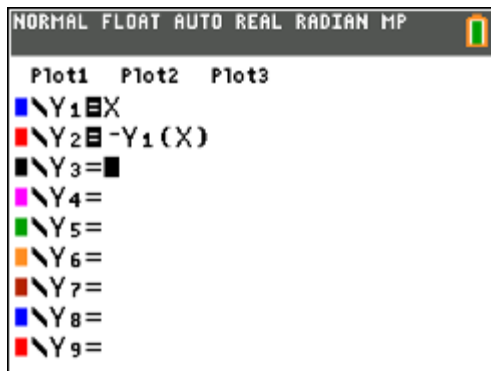
X	Y1	Y2			
0	0	3			
1	1	4			
2	2	5			
3	3	6			
4	4	7			
5	5	8			
6	6	9			
7	7	10			
8	8	11			
9	9	12			
10	10	13			

X=0

Change  $Y_1$  to  $Y_1 = X^2$ . (Leave  $Y_2$  the same).  
 What is the function that is being graphed now in  $Y_2$ ?

Compare graphs and tables. What do you notice?

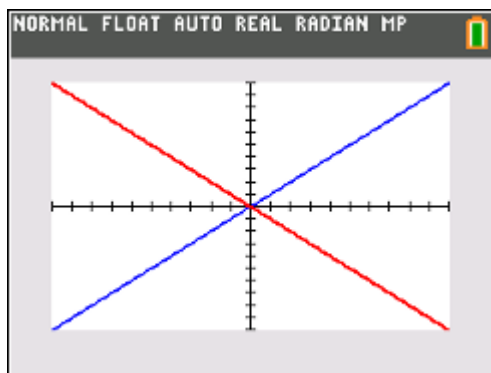
Change  $Y_1$  to any other function that you wish.  
 Any surprises?



Compare the graphs and tables of  $Y_1 = X$  and  $Y_2 = -Y_1(X)$ . What is the function that is being graphed in  $Y_2$ ?

How are the graphs the same?

How are the graphs different?



Compare the tables.  
What do you notice?

Change  $Y_1$  to  $Y_1 = X^2$ . (Leave  $Y_2$  the same).  
What is the function that is being graphed now in  $Y_2$ ?

Compare graphs and tables. What do you notice?

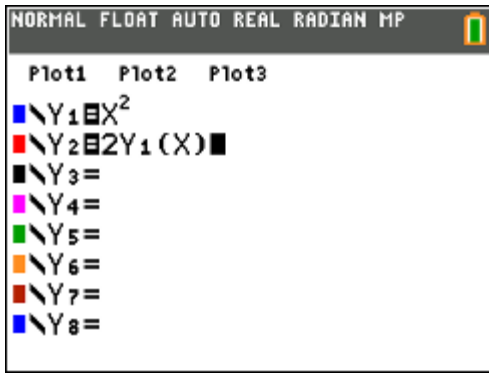
NORMAL FLOAT AUTO REAL RADIAN MP

PRESS + FOR ΔTb1

X	Y1	Y2
0	0	0
1	1	-1
2	2	-2
3	3	-3
4	4	-4
5	5	-5
6	6	-6
7	7	-7
8	8	-8
9	9	-9
10	10	-10

X=0

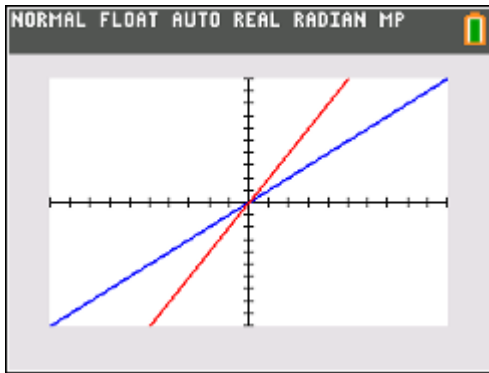
Change  $Y_1$  to any other function that you wish.  
Any surprises?



Compare the graphs and tables of  $Y_1 = X$  and  $Y_2 = 2Y_1(X)$ . What is the function that is being graphed in  $Y_2$ ?

How are the graphs the same?

How are the graphs different?



Compare the tables.  
What do you notice?

Change the value of 2. Try positive and negative numbers.  
What do you notice in the tables and graphs?

NORMAL FLOAT AUTO REAL RADIAN MP

PRESS + FOR  $\Delta$ Tb1

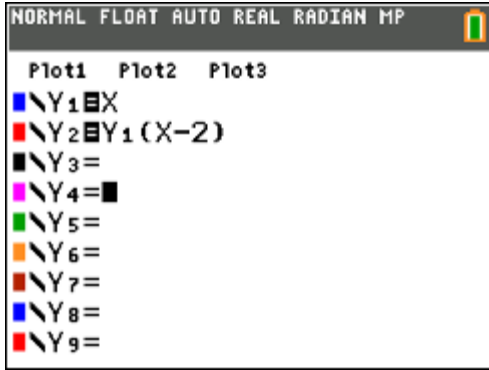
X	Y <sub>1</sub>	Y <sub>2</sub>			
0	0	2			
1	1	5			
2	2	8			
3	3	11			
4	4	14			
5	5	17			
6	6	20			
7	7	23			
8	8	26			
9	9	29			
10	10	32			

X=0

Change  $Y_1$  to  $Y_1 = X^2$ . (Leave  $Y_2$  the same).  
What is the function that is being graphed now in  $Y_2$ ?

Compare graphs and tables. What do you notice?

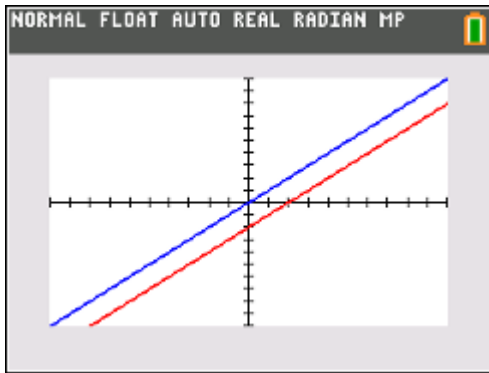
Change  $Y_1$  to any other function that you wish.  
Any surprises?



Compare the graphs and tables of  $Y_1 = X$  and  $Y_2 = Y_1(X-2)$ . What is the function that is being graphed in  $Y_2$ ?

How are the graphs the same?

How are the graphs different?



Compare the tables.  
What do you notice?

Change the value of -2. Try positive and negative numbers.  
What do you notice in the tables and graphs?

NORMAL FLOAT AUTO REAL RADIAN MP

PRESS + FOR  $\Delta T b 1$

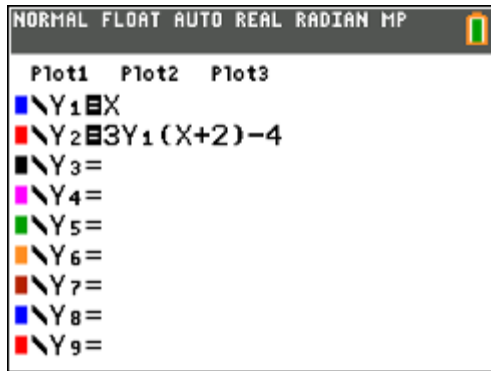
X	Y1	Y2			
0	0	-2			
1	1	-1			
2	2	0			
3	3	1			
4	4	2			
5	5	3			
6	6	4			
7	7	5			
8	8	6			
9	9	7			
10	10	8			

X=0

Change  $Y_1$  to  $Y_1 = X^2$ . (Leave  $Y_2$  the same).  
What is the function that is being graphed now in  $Y_2$ ?

Compare graphs and tables. What do you notice?

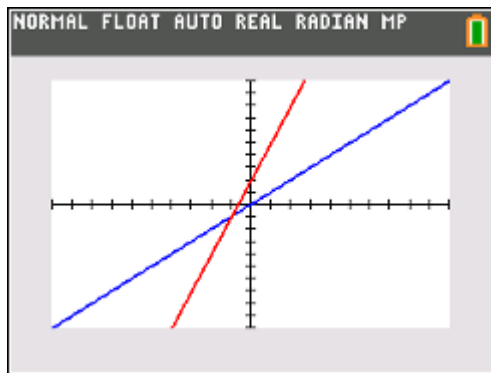
Change  $Y_1$  to any other function that you wish.  
Any surprises?



Compare the graphs and tables of  $Y_1 = X$  and  $Y_2 = Y_1(X+2) - 4$ . What is the function that is being graphed in  $Y_2$ ?

How are the graphs the same?

How are the graphs different?



Compare the tables.  
What do you notice?

Change  $Y_1$  to  $Y_1 = X^2$ . (Leave  $Y_2$  the same).  
What is the function that is being graphed now in  $Y_2$ ?

Compare graphs and tables. What do you notice?

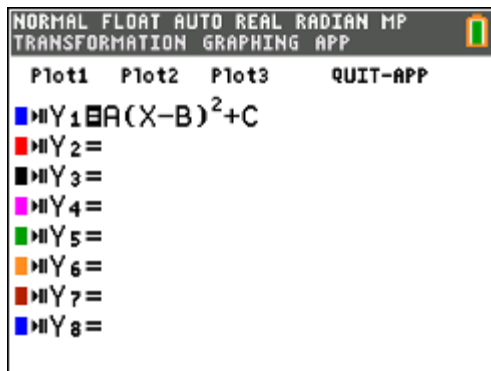
NORMAL FLOAT AUTO REAL RADIAN MP

PRESS + FOR  $\Delta$ Tb1

X	$Y_1$	$Y_2$			
0	0	2			
1	1	5			
2	2	8			
3	3	11			
4	4	14			
5	5	17			
6	6	20			
7	7	23			
8	8	26			
9	9	29			
10	10	32			

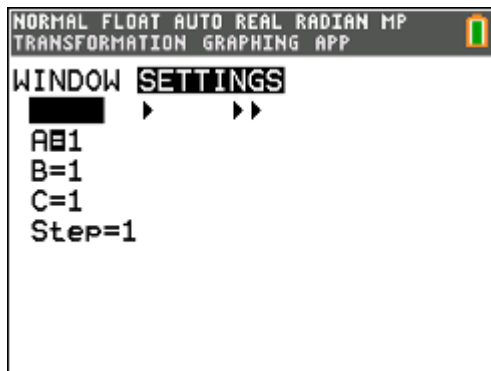
X=0

Change  $Y_1$  to any other function that you wish.  
Any surprises?



Investigate the TRANSFORMATION app on the TI-84

Change the settings and explore transformations on the parent function.



What are the effects of A, B, and C?

