ALGEBRA I ACTIVITY 15:
INVERSE VARIATION
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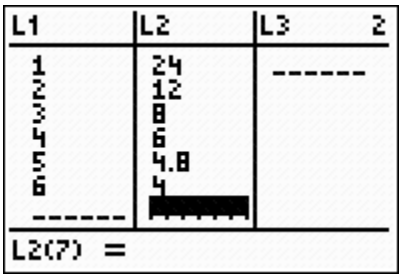
ACTIVITY OVERVIEW:
In this activity we will

- Examine a set of ordered pairs that vary inversely.
- Plot the ordered pairs. Examine the graph and table for relationships.
- Graph an inverse variation in [Y=] and use the table and graph to determine whether it is a function.

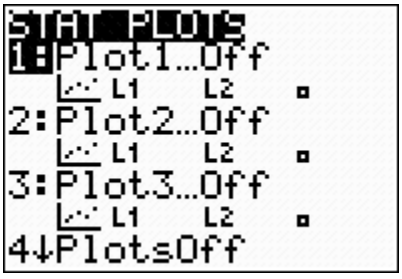
X	Y
1	24
2	12
3	8
4	6
5	4.8
6	4

Enter the data from the table above into lists.

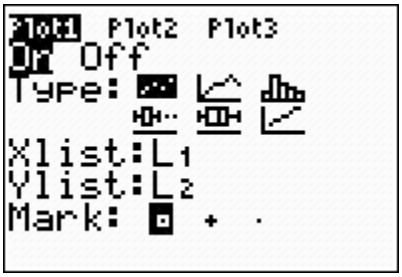
Press [STAT] [ENTER]. Enter the X column in **L1** and the Y column in **L2** as shown.



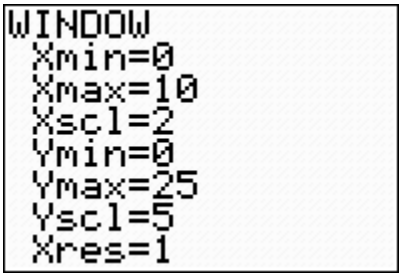
Press [2nd] [Y=]. Select **1: Plot 1**.



Press [ENTER] to turn the plot **On**. The default settings are appropriate because you want to create a scatter plot of your X and Y relationship.

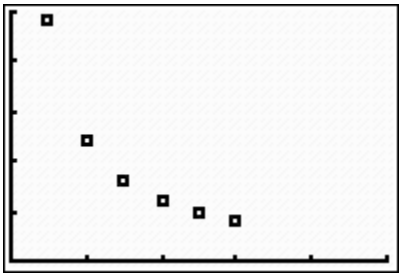


Press [WINDOW]. Set the window to [0, 10, 2, 0, 25, 5] as shown.



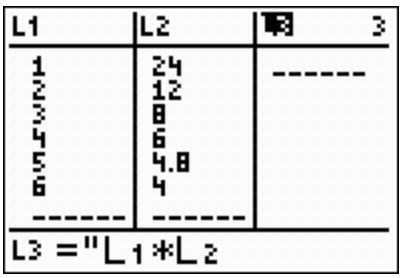
Press GRAPH. How would you describe the relationship between X and Y by examining this data?

[Examples: As X increases, Y decreases. The rate is not constant; the amount of change in Y is less and less as X increases.]

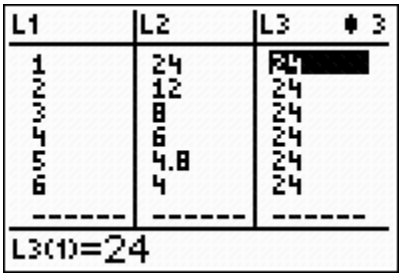


Press STAT ENTER to return to the lists. What relationships can you see by examining the numbers in the lists? What is the product of each pair of numbers?

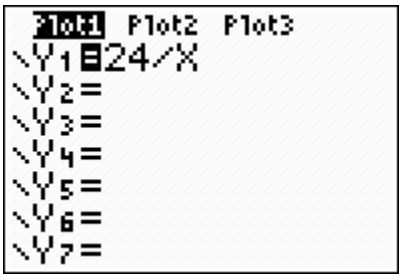
Arrow to the top of **L3**. Enter a formula to instruct the calculator to multiply the entries in **L1** by the entries in **L2**. Press ALPHA + 2nd 1 × 2nd 2. [Note: Putting the quotation mark first locks this formula in place.]



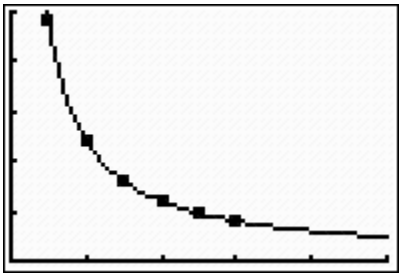
Press ENTER to execute the formula. The product in each case is 24. So, L1*L2=24 or X*Y=24. This relationship, when x and y have a constant product, is called "inverse variation." What type of situation might this be a formula for? [Area of 24 is the product of the length (X) and width (Y).]



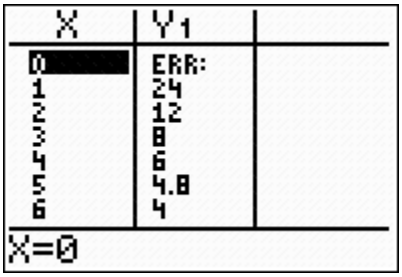
Solve the equation X*Y=24 for Y. Press Y=. Enter the equation into **Y1**.



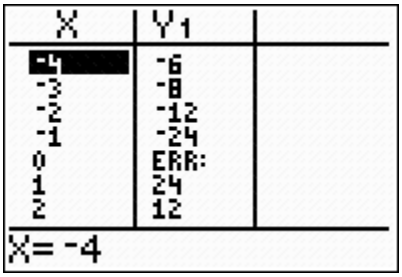
Press GRAPH. What other information can you find from the graph of the equation y = 24/x that you couldn't find from the plot? Does this graph appear to be a function?



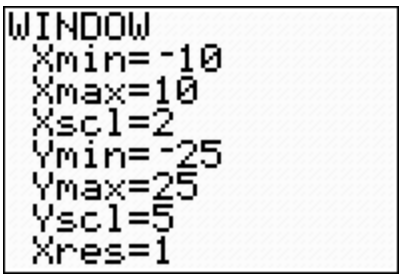
Press 2nd GRAPH to examine the table. What is happening when x=0? Why?



Arrow to negative values for X in the table. What do you notice about the Y values? Why does this occur? What do you think the graph of y = 24/x looks like to the left of the y-axis?



Press WINDOW. Set the window to [-10, 10, 2, -25, 25, 5] as shown to examine the graph when x is negative.



Press GRAPH. What appears to be happening when x=0? Why does the graph of the equation y = 24/x not appear in Quadrants 2 or 4? Do you think an inverse variation can ever be found in Quadrants 2 or 4? Does this graph appear to be a function now?