MATH 1311

Section 3.3

Modeling Data with Linear Functions

We have already seen how to create a linear function from two distinct data points. What we have not determined yet is how to identify if a collection of data points is, in fact, linear.

Remember, linear functions have a constant rate of change.

Test for Linearity:

To confirm the linearity of a set of data, you must determine the change in your independent and dependent variables. This change should be the same for every set of data points.

Galileo observed the following concerning the speed of an object falling versus its time spent falling:

t = seconds	0	1	2	3	4	5
V = feet per second	0	32	64	96	128	160

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From this data, you can develop a new table which compares the change in t values versus the change in V values. What do you notice?

Change in t	From 0 to 1	From 1 to 2	From 2 to 3	From 3 to 4	From 4 to 5
Change in V	32	32	32	32	32

Create the equation of the linear function representing this data:

t = seconds	0	1	2	3	4	5
V = feet per second	0	32	64	96	128	160

Another example:

Are the following tables linear or non-linear?

Data Set 1:

d	0	1	2	3	4	5
N	28,321	28,542	29,466	30,381	30,397	31,144

Data Set 2:

d	0	1	2	3	4	5
N	28,321	28,783	29,245	29,707	30,169	30,631

Another example:

Create an equation for the set of data that is linear.

Data Set 1:

d	0	1	2	3	4	5
N	28,321	28,542	29,466	30,381	30,397	31,144

Data Set 2:

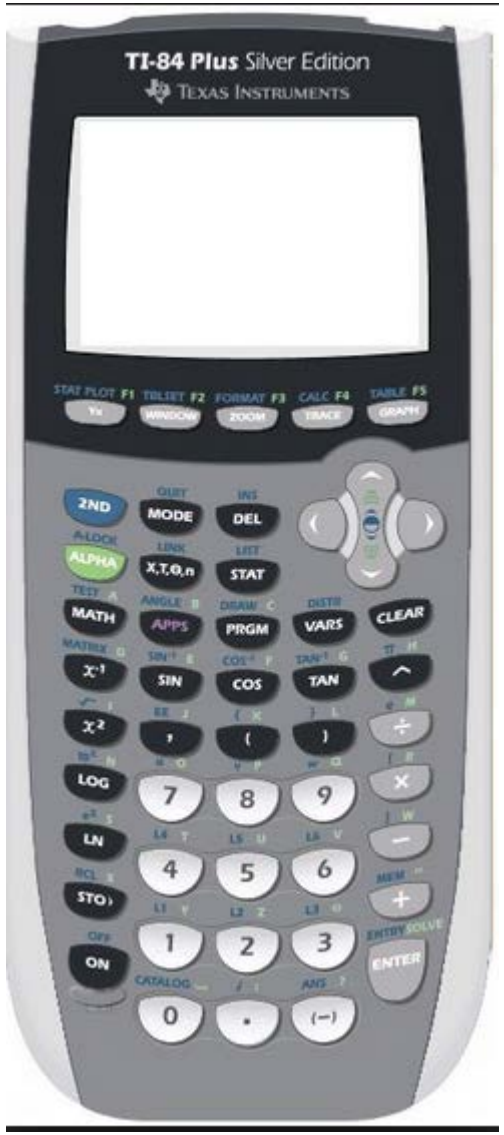
d	0	1	2	3	4	5
N	28,321	28,783	29,245	29,707	30,169	30,631

Calculator Applications:

Go to STAT, and select Edit.

This will allow you to input data into lists (Use L1 for one row of data and L2 for the other.)

Then press 2^{ND} and Y= (STAT PLOT) to graph a scatter plot.



Input the data from the linear model we have used. Also input your equation in Y= and graph them together.

What do you notice?

1. Does the table of data represent a linear function?

x	1	2	3	4	5	6
y	-2	0	2	4	6	8

2. If it is linear, determine the slope of the line.

3. If it is linear, determine the y-intercept.

4. Does the table of data represent a linear function?

x	1	2	3	4	5	6
y	6	7	9	11	13	16

5. If it is linear, determine the slope of the line.

6. If it is linear, determine the y-intercept.