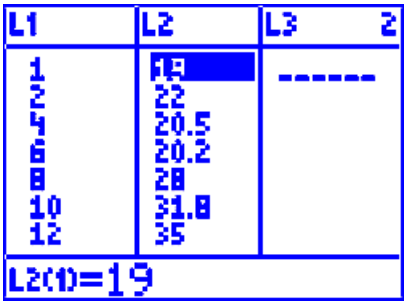
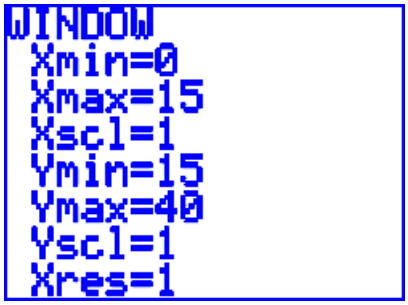
Unit 8: Lesson 03 — Interpretation of linear data using a graphing calculator

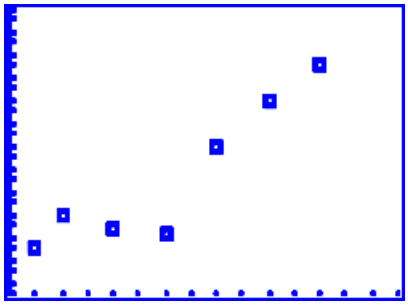
Example 1: Use the table to the right to produce a scatter plot on a graphing calculator (**Calculator Appendix M**). In the table, the left column (*x*) is for a particular year while the corresponding number in the right column (*y*) is the amount of rainfall (in inches) for that particular year.

Make a sketch of the scatter plot produced by the calculator.

x (year)	y (inches of rain)
1	19
2	22
4	20.5
6	20.2
8	28
10	31.8
12	35







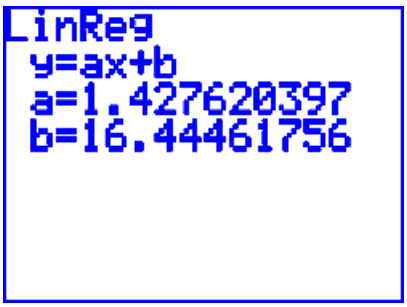
Example 2: What is the independent variable of Example 1?

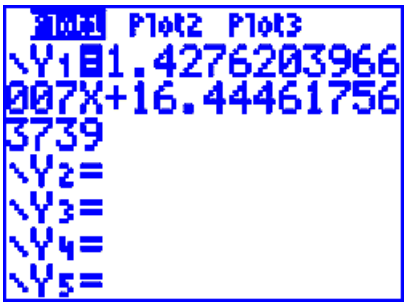
x (years)

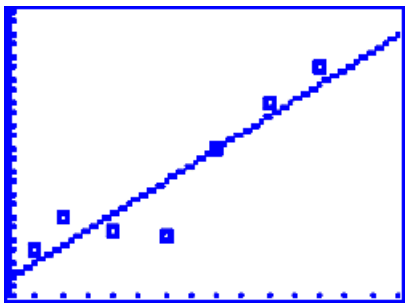
Example 3: What is the dependent variable of Example 1?

y (inches of rain)

Example 4: Perform a linear regression on the scatter plot of Example 1 (See **Calculator Appendix N**). Make a sketch of the calculator display.







Example 5: What is the equation of the line of best-fit?

y = 1.427620397x + 16.44461756

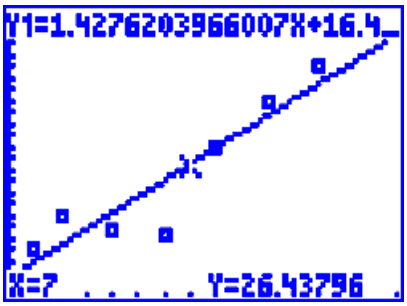
Example 6: What is the correlation of this data (positive, negative, or none)? Justify your answer.

positive correlation… because the line of best-fit has a positive slope.

Example 7: What is the slope of the line of best-fit? What is the y-intercept? Give both rounded to 2 decimal places.

slope = m = 1.43
y-intercept = b = 16.44

Example 8: Based on the line of best-fit, what would be a good estimate for the rainfall (rounded to the nearest whole number) that would be expected in year 7. Use the calculator to evaluate the linear function of best-fit at x = 7. (See **Calculator Appendix F** and an associated video for how to evaluate a function at a particular *x* value.)



26 inches of rain

Example 9: What is the **rate of increase** of rainfall and what are its units?

The rate of increase of rainfall is the slope = 1.43 inches/year

Example 10: Using a rainfall linear function built from the slope and intercept of Example 7, in what year would there be 33 inches of rain? (Do this problem algebraically, not graphically on the calculator.)

$y = 1.43x + 16.44$

$33 = 1.43x + 16.44$

$33 - 16.44 = 1.43x$

$16.56 = 1.43x$

$\frac{16.56}{1.43} = x$; $x = 11.58$ yr

See **Enrichment Topic I** for an extension of the ideas presented in the three lesson of this unit: statistics.

See **Calculator Appendix P** for how to do statistics on a graphing calculator.

Assignment:

1. Use the table to the right to produce a scatter plot on a graphing calculator. In the table, the left column (*x*) is for the time in minutes while the corresponding number in the right column (*y*) is the altitude in feet of an airplane at that time.

Make a sketch of the scatter plot produced by the calculator.

x (time, sec.)	y (altitude, ft.)
0	3,000
4	2,800
10	2,200
15	1,700
18	1,200
23	1,000
27	800

2. What is the dependent variable of problem 1?

3. What is the independent variable of problem 1?

4. Perform a linear regression on the scatter plot of problem 1. Make a sketch of the calculator display.

5. What is the equation of the line of best-fit in slope-intercept form?

6. What is the correlation of this data (positive, negative, or none)? Justify your answer.

7. What is the slope of the line of best-fit? What is the y-intercept? Give both rounded to 2 decimal places.

8. Based on the line of best-fit, what would be a good estimate for the altitude of the airplane (rounded to the nearest whole number) that would be expected at time x = 12 sec. Use the calculator to evaluate the linear function of best-fit at x = 12.

9. What is the rate of descent of the airplane? What are the units of the rate?

10. Using an altitude linear function built from the slope and intercept of problem 7, at what time would the altitude be 500 ft? (Do this problem algebraically, not graphically on the calcultor.)

When this lesson is finished, proceed to the cumulative review.