



2-5: Using Linear Models

Mr. Gallo
Algebra 2

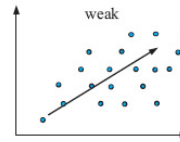
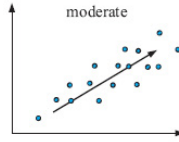
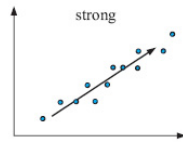


Scatterplots & Correlation

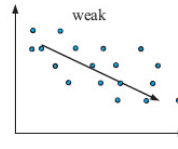
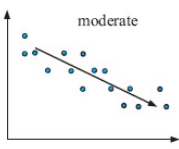
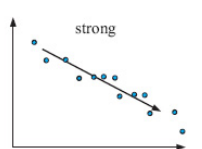
- Scatterplot
 - Relates two sets of data
 - Plots the data as ordered pairs
 - Used to tell the strength of a relationship (correlation)

- Correlation
 - How close the data points fall along a line
 - The closer the points fall to a line:
 1. The stronger the relationship
 2. The stronger the positive or negative correlation.

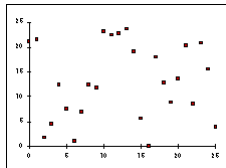
Positive Correlations



Negative Correlations



No Correlation



Complete Got It? #1
p.93

- Strong negative
- About \$170

Linear Regression Function TI-84

1. Enter the data into STAT EDIT (L_1, L_2, L_3 , etc.)
2. Press STAT; move the cursor to CALC and press 4:LinReg(ax+b)
3. Enter the lists followed by commas; press VARS
4. Move the cursor to Y-VARS; press 1:Function
5. Choose Y_1
6. Press ENTER

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$$y = 3575.38x - 123660.71$$

<p>1. Create a scatterplot of the data using your graphing calculator.</p> <p>2. What type of correlation do you see in the graph (positive, negative, or none)?</p> <p>3. Draw a line of best fit using the LinReg function on your calculator. What is the equation of this line?</p> <p>4. Use this equation to predict the number of traffic deaths in the United States in 1990. There were approximately 143.5 million cars in the US in 1990.</p>	Country	Cars (Millions)	Traffic Deaths
	Argentina	4.3	3,054
	Australia	7.7	4,210
	Belgium	3.8	1,937
	Bulgaria	1.3	1,409
	Canada	12.6	4,210
	France	23.6	10,198
	Israel	0.8	439
	Italy	27.3	8,717
	Japan	34.9	14,398
W. Germany	30.7	7,435	

Correlation Coefficient

- The **r** number from the linear regression model is called the **correlation coefficient** .
- This number is from **-1** to **1** . The absolute value of the r number indicates the **strength** of the **linear** relationship.
- When $|r| = \underline{\mathbf{1}}$, there is a perfect linear relationship.
- When $|r| = \underline{\mathbf{0}}$, there is a no linear relationship.

Correlation Coefficient

- The closer the number is to 1, the stronger the linear relationship between the variables.
- The closer the number is to 0, the weaker the linear relationship between the variables.
- The sign of the r-value indicates a positive or negative slope for the linear regression. In this case the sign is positive, therefore a positive slope indicated.

Below is the population of Kansas based on census data for the years 1900 through 1990.

a. Create a scatterplot of the data.

b. What type of correlation do you see in the graph (positive, negative, or none)?

c. Draw a line of best fit using the LinReg function on your calculator. What is the equation of this line?

d. Use this equation to predict the population of Kansas in 2010.

Year	Population (thousands)
1900	1,480
1910	1,690
1920	1,780
1930	1,890
1940	1,800
1950	1,920
1960	2,190
1970	2,250
1980	2,350
1990	2,490

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Homework: p. 96 #7-11 odd, 14 (a-c), 19 (a-d), 20-23, 27-29

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