Algebra 2 2.5

Use scatter plots and prediction equations

Use lines of regression* to model data

bivariate data (chirps, temp)

scatter plot

dot plot

correlation (positive, negative, none)

line of fit by hand

prediction equation

regression equation by calc.

correlation coefficient r

graphing calculators & scatter plots

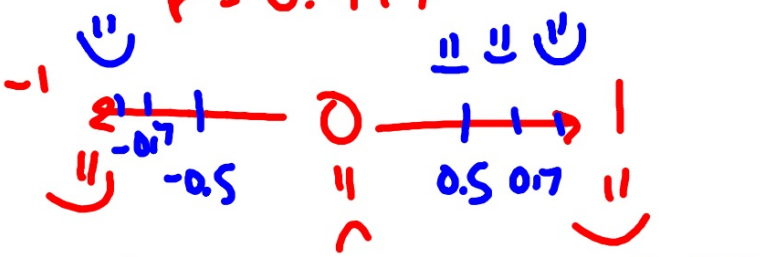
(r^2)

* You can use graphing calculator (if you have one).
If no GC, do old school

temp = chirps

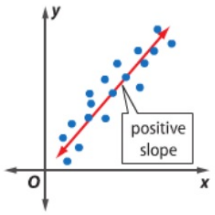
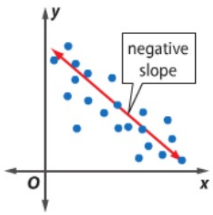
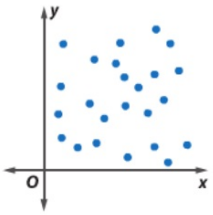
$y = 0.336x + 34.333$

$r = 0.977$



temp = 0.336 chirps + 34.333

KeyConcept Scatter Plots

positive correlation	negative correlation	no correlation
		
Strong Positive Correlation	**Weak Negative Correlation**	**No Relative Correlation**
The slope of the line is positive and the points are close to the line.	The slope of the line is negative and the points are not close to the line.	There is no obvious pattern of increase or decrease for the given data.

Graphing calculator (if you have one)

2 Lines of Regression Another method for writing a line of fit is to use a line of regression. A **regression line** is determined through complex calculations to ensure that the distance of all data points to the line of fit are at a minimum. Most graphing calculators and spreadsheets can perform these calculations easily.

The **correlation coefficient** r, $-1 \leq r \leq 1$, is a measure that shows how well data are modeled by a linear equation.

- When r is close to -1, the data have a negative correlation.
- When $r = 0$, the data have no correlation.
- When r is close to 1, the data have a positive correlation.

Gr calc is the only way to get a *number* for correlation!

(handout)
Basic calculator operation:
Turn on & check settings
Contrast adjustments
Mode key
y=
Statplots
Clear screen
Lists

Exercises

1. **SALARIES** The table below shows the years of experience for eight technicians at Lewis Techomatic and the hourly rate of pay each technician earns.

L1	Experience (years)	9	4	3	1	10	6	12	8
L2	Hourly Rate of Pay	$17	$10	$10	$7	$19	$12	$20	$15

a. Draw a scatter plot to show how years of experience are related to hourly rate of pay. Draw a line of fit and describe the correlation.

b. Write a prediction equation to show how years of experience (x) are related to hourly rate of pay (y).

c. Use the function to predict the hourly rate of pay for 15 years of experience.

Example **WORLD POPULATION** **The following table gives the United Nations estimates of the world population (in billions) every five years from 1980–2005. Find the equation and graph the line of regression. Then predict the population in 2010.**

x Year	y Population (billions)
1980	4.451
1985	4.855
1990	5.295
1995	5.719
2000	6.124
2005	6.515
2010	?

Source: UN 2006 Revisions Population database

1. The table below shows the number of women who served in the United States Congress during the years 1995–2006. Find an equation for and graph a line of regression Then use the function to predict the number of women in Congress in the 112th Congressional Session.

Congressional Session	Number of Women
104	59
105	65
106	67
107	75
108	77
109	83

Source: U. S. Senate