

# Scatter Plots & Correlation Notes

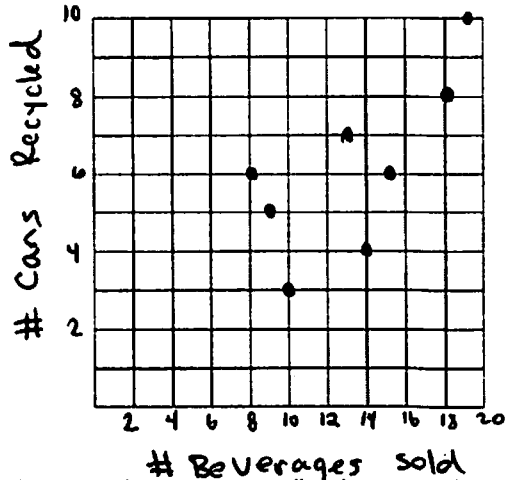
Name: Key

Date: 1/26/15

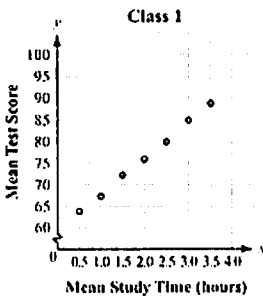
A **scatter plot** is often used to present bivariate **quantitative** data. Each variable is represented on an axis and the axes are labeled accordingly.

Make a scatter plot for this data:

Beverage Can Recycling								
Number of Canned Beverages Sold	13	15	19	8	10	13	9	14
Number of Cans Recycled	8	6	10	6	3	7	5	4



A scatter plot displays data as points on a grid using the associated numbers as coordinates or ordered pairs (x, y). The way the points are arranged by themselves in a scatter plot may or may not suggest a relationship between the two variables. For instance, by reading the graph below, do you think there is a relationship between the hours spent studying and exam grades?



yes, there is a relationship

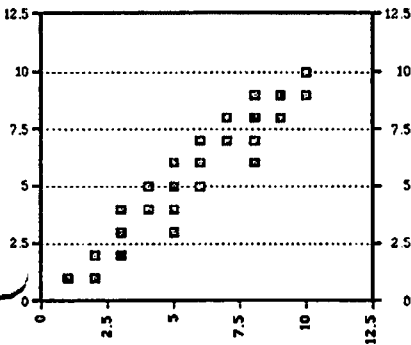
- positive relation
- The more you study, the higher your grade will be.

If y tends to increase as x increases, then the data have **positive** correlation. *positive slope* ↑↑ ↓↓

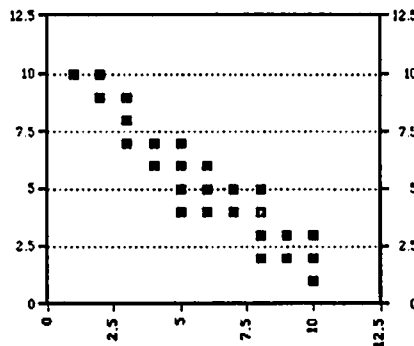
If y tends to decrease as x increases, then the data have **negative** correlation. *Negative slope* ↑↓

If x and y seem to have no relationship, or the data show no pattern the data has **NO** correlation.

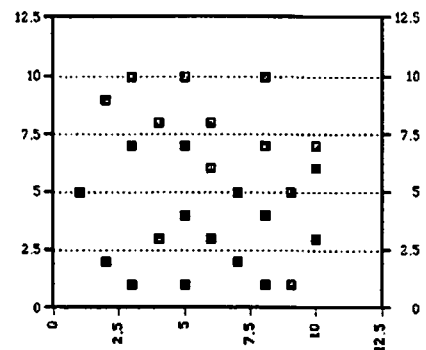
High Positive Correlation



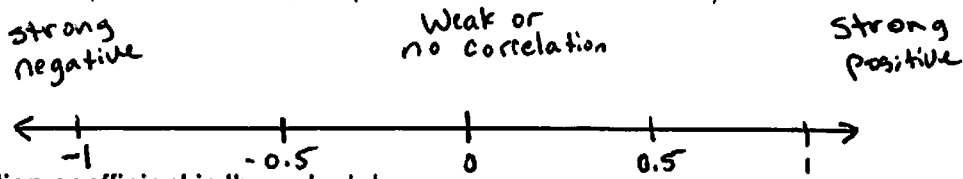
High Negative Correlation



No Correlation



A correlation coefficient, denoted by  $r$ , is a number from -1 to 1 that measures how well a line fits a set of data pairs  $(x, y)$ . If  $r$  is near 1, the points lie close to a line with a positive slope. If  $r$  is near -1, the points lie close to a line with a negative slope. If  $r$  is near 0, the points do not lie close to any line.



Find the correlation coefficient in the calculator.

a.

Beverage Can Recycling								
Number of Canned Beverages Sold	18	15	19	8	10	13	9	14
Number of Cans Recycled	8	6	10	6	3	7	5	4

$r = 0.71$   
(strong positive)

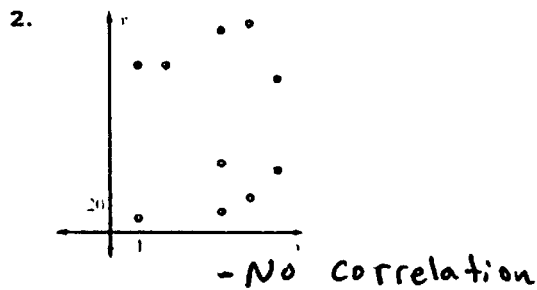
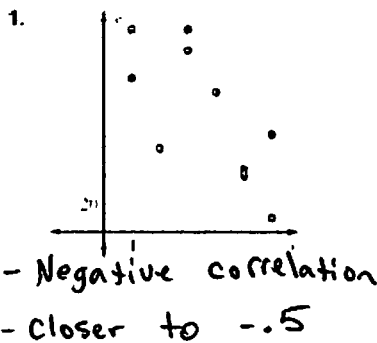
b.

Hours (x)	1	2	3	4	5	6	7	8
Miles (y)	35	29	26	20	16	9	6	0

$r = -1$   
(strong Negative)

Practice Problems:

For each scatter plot, tell whether the data have a positive correlation, a negative correlation, or no correlation. Then, tell whether the correlation is closest to -1, -0.5, 0, 0.5, or 1.



3. Positive, negative, or no correlation?

- a. Amount of exercise and percent of body fat Negative
- b. A person's age and the number of medical conditions they have Positive
- c. Temperature and number of ice cream cones sold Positive
- d. The number of students at Lassiter and the number of dogs in Atlanta No correlation
- e. Age of a tadpole and the length of its tail Negative