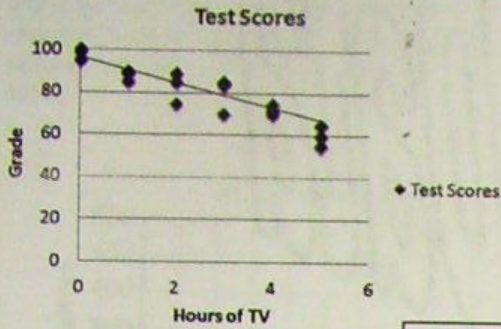## Introducing Scatter Plots
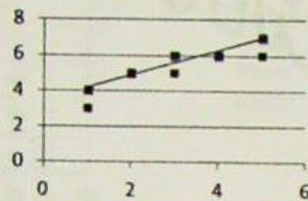
A <u>scatter plot</u> is a type of graph that relates two groups of data.
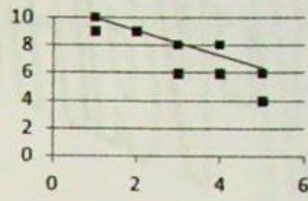
Test Scores

What does this trend tell us about grades and how much TV you watch?

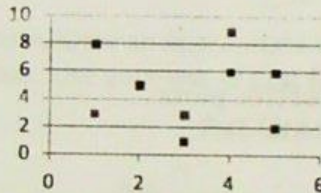*The more hours of TV watched, the lower the grades.*

There are 3 kinds of scatter plot correlations:

Positive Correlation – both sets of data increase together.

Negative Correlation – one set of data increases, while the other decreases.

No Correlation – when the data doesn't seem to be related.

What kind of correlation would you expect between the following data sets?

1. A person's age and the number of pets he/she has ___*None*___

2. The number of times you brush your teeth and the number of cavities you have ___*Negative*___

3. The number of days it rains in a year and the number of umbrellas sold ___*Positive*___

4. Choose the scatter plot that best represents the relationship between the age of a car and the amount of money spent each year on repairs. Explain.
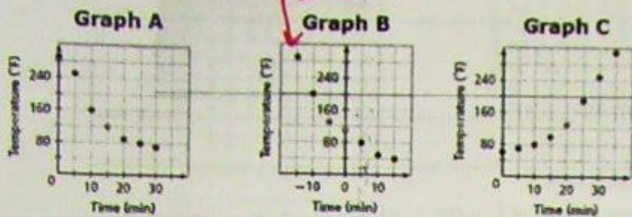
   Graph A   Graph B   Graph C

   Yearly Repair Costs   Yearly Repair Costs   Yearly Repair Costs
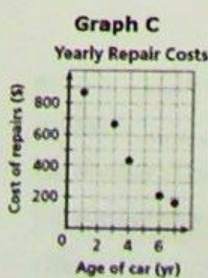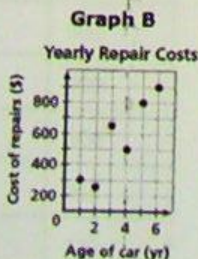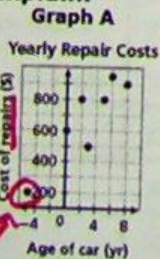
   Which graph? _*B*_ Explanation: _*The older the car, the repair cost would increase.*_

DMS

5. Choose the scatter plot that best represents the relationship between the number of minutes since a pie has been taken out of the oven and the temperature of the pie. Explain.

DMS

Graph A

Graph B

Graph C

Which graph? __A__ Explanation: __The temperature would decrease after it is out of the oven.__

Introducing Trend Lines or Lines of Best Fit

You can graph a function on a scatter plot to help show a relationship in the data. Sometimes the function is a straight line. This line, called a **trend line**, helps show the correlation between data sets more clearly. It can also be helpful when making predictions based on the data.

6. The scatter plot shows a relationship between the total amount of money collected at the concession stand and the total number of tickets sold at a movie theater. Based on this relationship, predict how much money will be collected at the concession stand when 150 tickets have been sold.
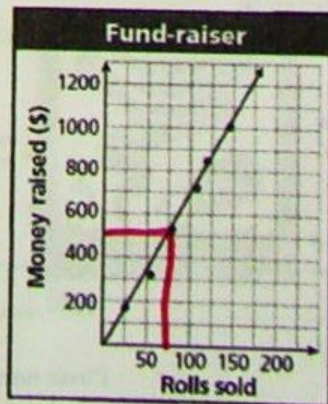
Concession Stand Sales

Concession Stand Sales
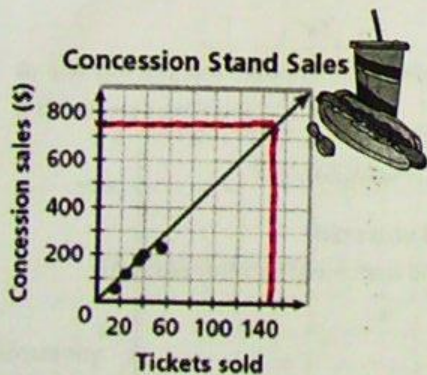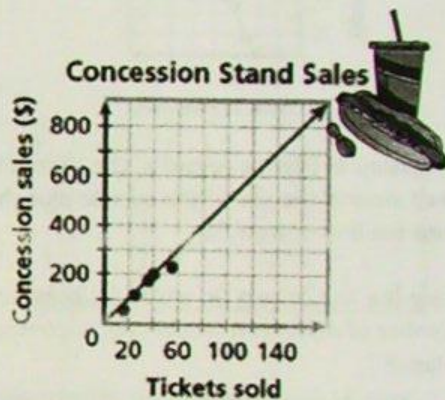
__$750__

__Extrapolation__ : The prediction is on the outside of the data

7. Based on the trend line, predict how many wrapping paper rolls need to be sold to raise $500.

__75 rolls__

__Intrapolation__ the prediction is within the data.

Fund-raiser

Practice with Scatter Plots

For Items 1 and 2, identify the correlation you would expect to see between each pair of data sets. Explain.

1. The outside temperature in the summer and the cost of the electric bill _____

_____

2. The price of a car and the number of passengers it seats_____

_____

3. The scatter plot shows the number of orders placed for flowers before Valentine's Day at one shop.

Valentine's Day Orders
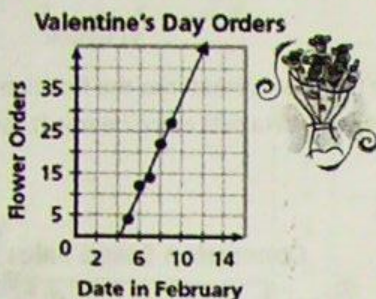
Based on this relationship, predict the number of flower orders placed on February 12.

_____

4. A group of friends recorded the time it took to ride their bikes around the park. The scatter plot shows their results with the line of best fit.

Using the line of best fit, which is *closest* to the number of minutes it would take to complete 9 laps?
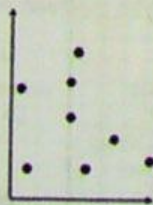
A. 4   B. 5   C. 6   D. 7

BICYCLING AROUND THE PARK
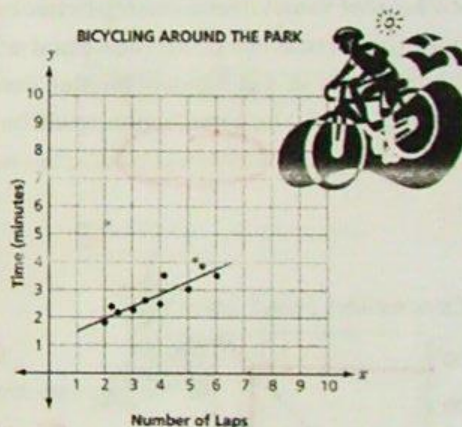
5. The scatter plots of data relate characteristics of children from 0 to 18 years old.
State the **type of correlation** (positive, negative, or none) for each plot and **match** each scatter plot with the appropriate **variables** studied.
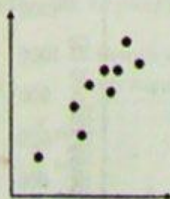
    a. age and height
    b. age and eye color
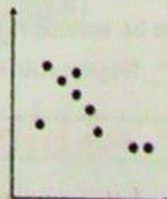   c. age and time needed to run a certain distance

Type:_____   Type:_____   Type:_____

Circle one: Circle one: Circle one:
 a.   b.   c.   a.   b.   c.   a.   b.   c.

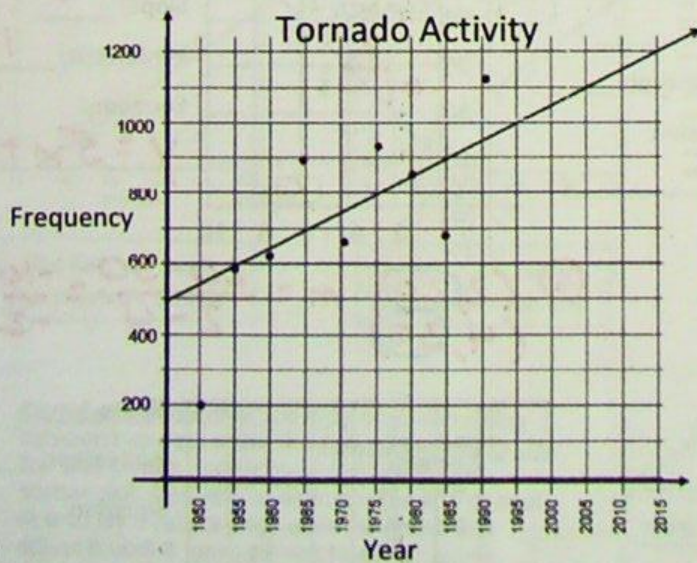**6. Which graph best shows a positive correlation between the number of hours studied and the test scores?**

A.

Test Scores (y-axis: 10–100)
Number of Hours Studied (x-axis: 0–10)

C.

Test Scores (y-axis: 10–100)
Number of Hours Studied (x-axis: 0–10)

B.

Test Scores (y-axis: 10–100)
Number of Hours Studied (x-axis: 0–10)

D.

Test Scores (y-axis: 10–100)
Number of Hours Studied (x-axis: 0–10)
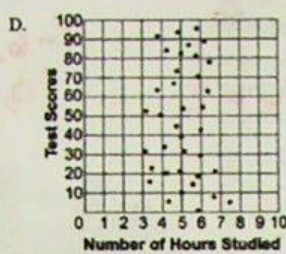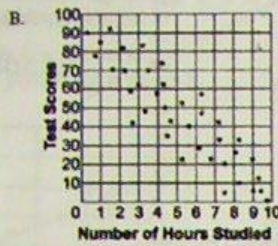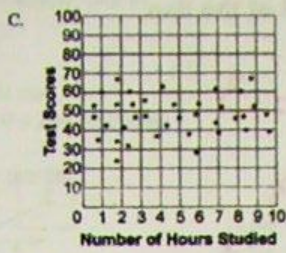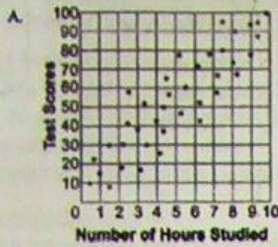
7. Which of the scatter plots suggests a strong negative correlation?

A   B   C   D
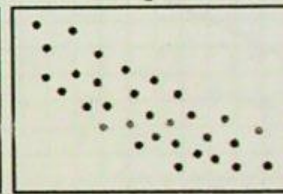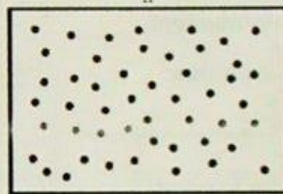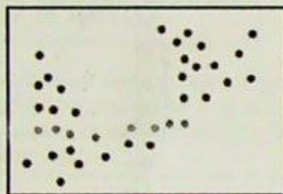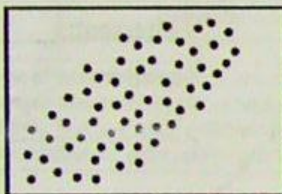
8. Use the line of best fit to predict how many tornadoes may be reported in the United States in 2015 if the trend continues.

Tornado Activity

Frequency (y-axis: 200, 400, 600, 800, 1000, 1200)
Year (x-axis: 1950, 1955, 1960, 1965, 1970, 1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015)
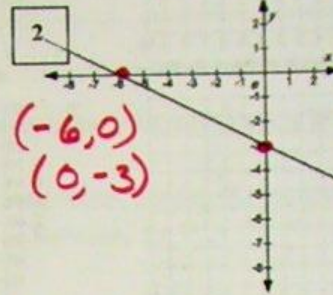
_____

$$y = mx + b$$

Review Writing an Equation from a Graph

Find the slope of the line, the y-intercept of the line, and write the equation for the line.

b = y-intercept where the line intersects the y-axis

m = slope, draw your step $\dfrac{rise}{run}$

$(0,2)$
$(1,5)$
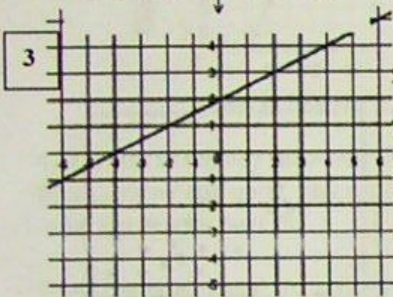$m = \dfrac{2+5}{0+1} = \dfrac{-3}{-1} = 3$

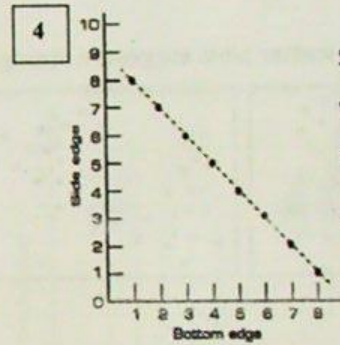**1**
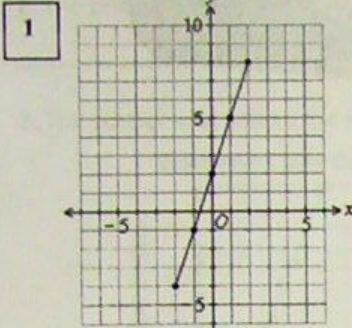
Slope: __3__

y-intercept: __2__

Equation:

$y = 3x + 2$

2

$(-6,0)$
$(0,-3)$
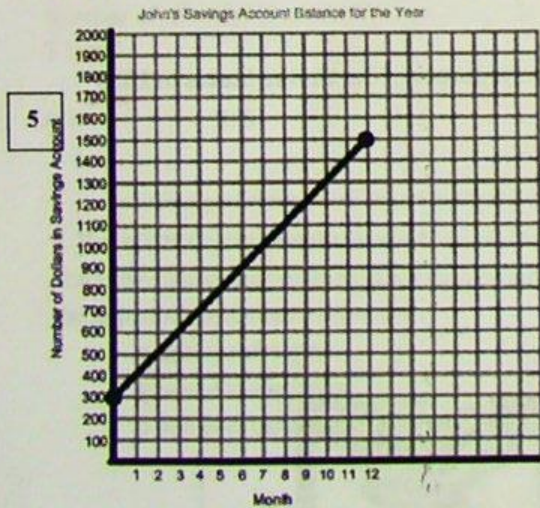
Slope: _____

y-intercept: _____

Equation:

_____

Length vs. Width
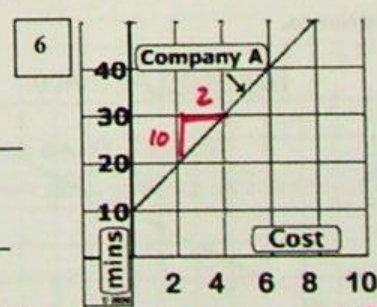
3

Slope: _____

y-intercept: _____

Equation:

_____

4

Slope: _____

y-intercept: _____

Equation:

_____

John's Savings Account Balance for the Year

5

Slope: _____

y-intercept: _____

Equation:

_____

Number of Dollars in Savings Account

Month

6

Company A

Slope: __5__

y-intercept: __10__

Equation:

$y = 5x + 10$

Cost

⑥ $(2,20)$
$(4,30)$
$m = \dfrac{20-30}{2-4} = \dfrac{-10}{-2} = 5$

mins

7

Company B

Slope: _____

y-intercept: _____

Equation:

_____

Cost

mins

8

Company C

Slope: _____

y-intercept: _____

Equation:

_____

Cost

mins