

# 5-7 Practice Form K

A **scatter plot** is a graph that relates two different sets of data by displaying them as ordered pairs. A scatter plot can show a trend or correlation, which may be either positive or negative. Or the scatter plot may show no trend or correlation. It is often easier to determine whether there is a correlation by looking at a scatter plot than it is to determine by looking at the numerical data.

If the points on a scatter plot generally slope up to the right, the two sets of data have a positive correlation. If the points on a scatter plot generally slope down to the right, the two sets of data have a negative correlation. If the points on a scatter plot do not seem to generally rise or fall in the same direction, the two sets of data have no correlation.

## Example 1

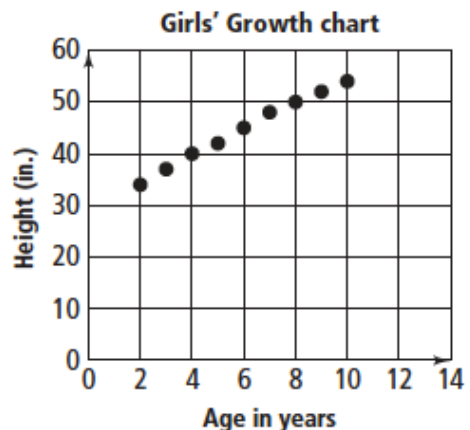
The table below compares the average height of girls at different ages. Make a scatter plot of the data. What type of correlation does the scatter plot indicate?

Age in years	2	3	4	5	6	7	8	9	10
Height in Inches	34	37	40	42	45	48	50	52	54

Treat the data as ordered pairs. The average height of a 2-year old girl is 34 inches, so one ordered pair is (2, 34). Plot this point. Then plot (3, 37), (4, 40), (5, 42), (6, 45), (7, 48), (8, 50), (9, 52), and (10, 54).

Notice that the height increases as the age increases. There is a positive correlation for this data.

A **trend line** is a line on a scatter plot that is drawn near the points. You can use a trend line to estimate other values.



# 5-7 Practice Form K (continued)

## Example 2

Draw a trend line for the scatter plot in the previous problem. What is the equation for your trend line? What would you estimate to be the average height of a girl who is 12 years old?

Draw a line that seems to fit the data. The line drawn for this data goes through (4, 40) and (8, 50). Use these points to write an equation.

$$m = \frac{50 - 40}{8 - 4} = 2.5$$

Use the point-slope form of the line.

$$y - y_1 = m(x - x_1)$$

$$y - 40 = 2.5(x - 4)$$

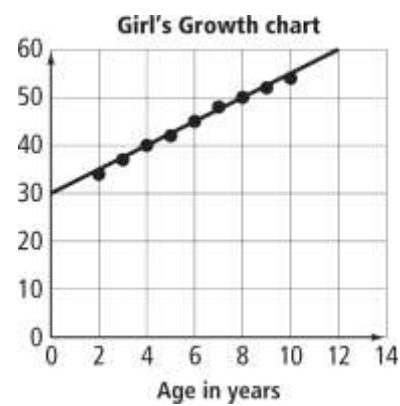
$$y - 40 = 2.5x - 10$$

$$y = 2.5x + 30$$

Use this equation to estimate the average height of 12-year old girls.

$$y = 2.5(12) + 30$$

$$y = 60$$



### PROBLEMS:

For each table, make a scatter plot of the data. Describe the type of correlation the scatter plot shows. USE GRAPH PAPER.

1.

Tips Earned by Waiter					
Hours Worked	2	3	6	8	9
Tips (\$)	36	62	120	148	165

2.

Foots Size and Height					
Foot Size (in.)	10	13	8	6	11
Height (in.)	70	77	66	61	72

3.

Tickets Sold					
Adult Tickets	10	20	30	40	50
Children Tickets	30	55	80	112	137

4.

Test Scores					
Test Score	76	85	83	97	92
Study Time (min)	33	52	49	101	65

5. Use the table below and a scientific calculator.

Ohio Resident Population							
Year	1960	1970	1980	1990	2000	2005	2010
Population (thousands)	9706	10,652	10,798	10,847	11,353	11,478	11,576

Source: U.S. Census Bureau

- Make a scatter plot of the data pairs [years since 1960 ( $x=0$  for 1960 and adjust all other values accordingly), population]. USE GRAPH PAPER.
- Draw a line of best fit for the data.
- Write an equation for the line of best fit.
- According to the data, what will the estimated resident population in Ohio be in 2030?

6. Use the table below and a scientific calculator.

Sales of Hybrid Cars in the U.S.							
Year	2001	2002	2003	2004	2005	2006	2007
Cars Sold (thousands)	20	38	54	84	206	252	288

SOURCE: hybridcars.com

- Make a scatter plot of the data pairs (years since 2001, cars sold). USE GRAPH PAPER.
- Draw a line of best fit for the data.
- Write an equation for the line of best fit.
- According to the data, about how many hybrid cars will be sold in 2020?