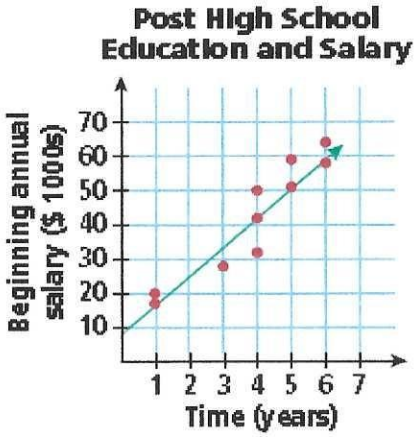
Name_____ Date:_____

Mrs. Roumbos 8R Period_____

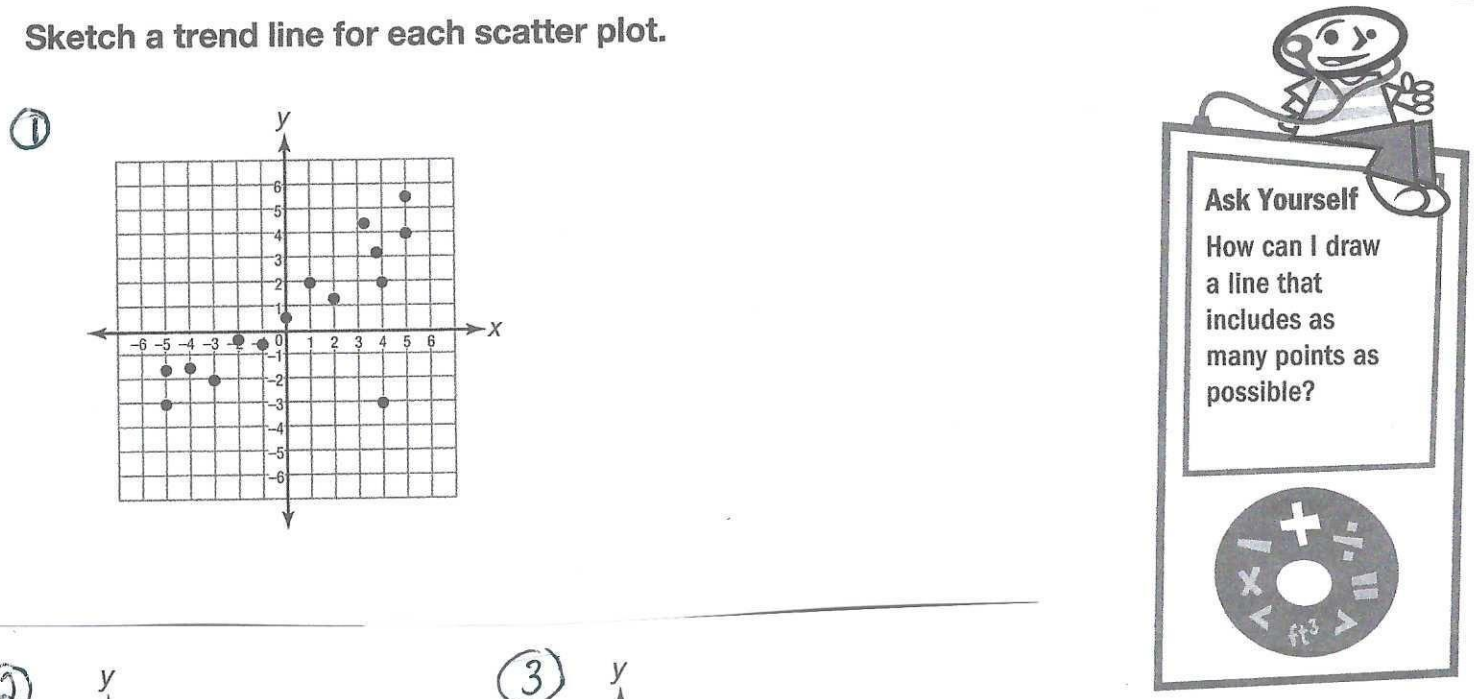
Line of Best fit

When data is displayed with a **scatter plot**, it is often useful to attempt to represent that data with the equation of a straight line for purposes of predicting values that may not be displayed on the plot.
Such a straight line is called the "**line of best fit**."
It may also be called a "trend" line.

> A **line of best fit** is a straight line that best represents the data on a scatter plot.
> This line may pass through some of the points, none of the points, or all of the points.

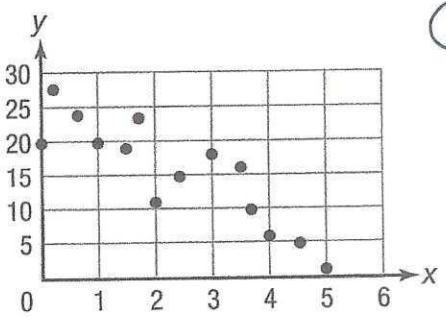


Sketch a trend line for each scatter plot.



①

②



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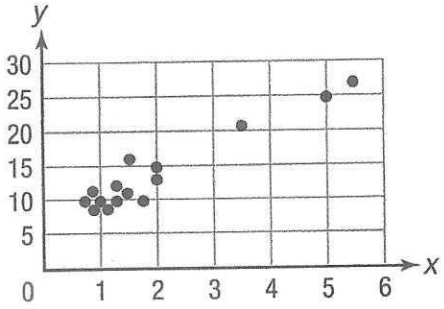
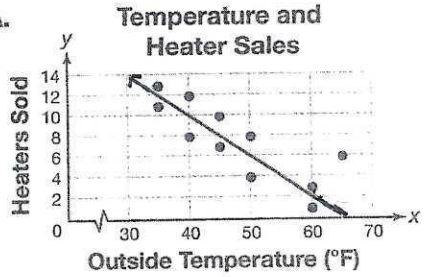


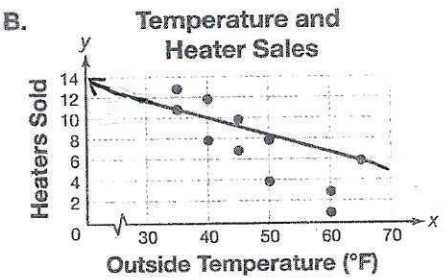
Consider each pair of identical scatter plots. Circle the letter of the plot that shows the better trend line. Explain your choice.

①

A.

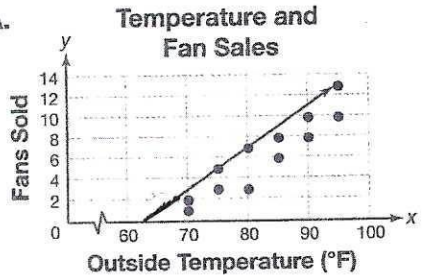


B.

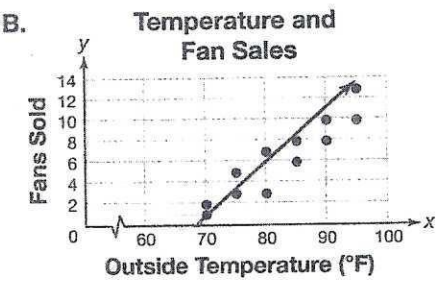


②

A.



B.



_____ _____

_____ _____

Using a Scatter Plot to Make Predictions

Make a scatter plot of the data, and draw a line of best fit. Then use the data to predict the exam grade of a student who studies 4 hours per week.

Hours studied	5	9	3	12	1	2	6	7
Exam grade	80	95	75	98	70	95	82	88

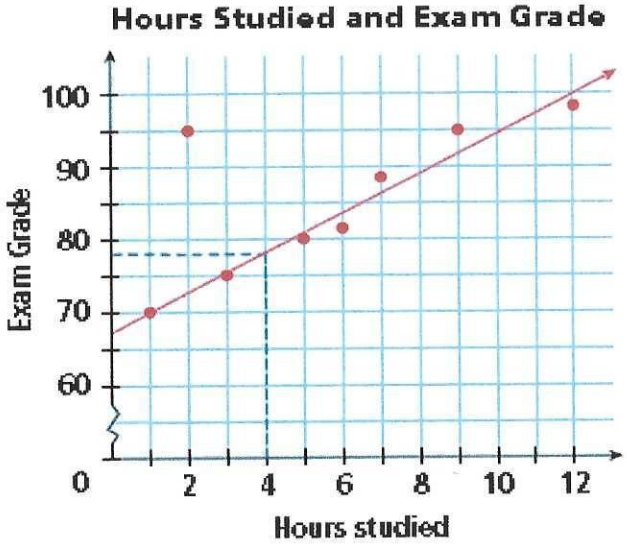
Step 1: Make a scatter plot.

Let hours studied represent the independent variable x and exam grade represent the dependent variable y.

A student's exam grade may be dependent on the number of hours studied.

Step 2: Draw a line of best fit.

Draw a line that has about the same number of points above and below it. Ignore any outliers when drawing a line of best fit.



The data point (2, 95) is an outlier because it lies far away from the other data points.

Step 3: Make a prediction.

According to the graph, a student who studies 4 hours per week should earn a score of about 78.

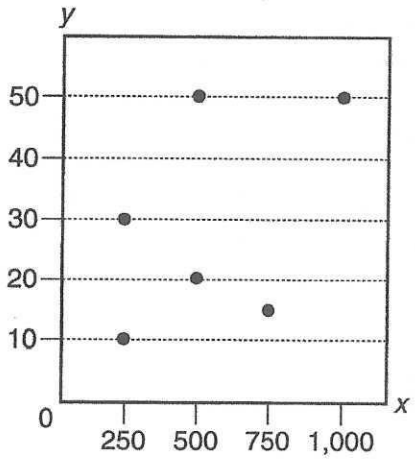
Find the point on the line whose x-value is 4. The corresponding y-value is about 78.

CCSS: 8.SP.1, 8.SP.2

Practice

Directions: For questions 1 through 4, write whether each scatter plot shows a positive, negative, or no association. If the scatter plot shows an association, draw a trend line and make a given prediction.

1.

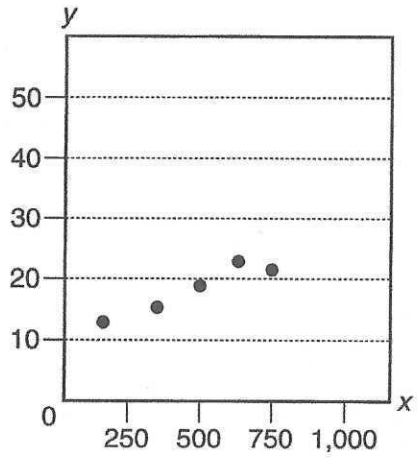


association: _____

prediction for y when x is 300:

_____

2.

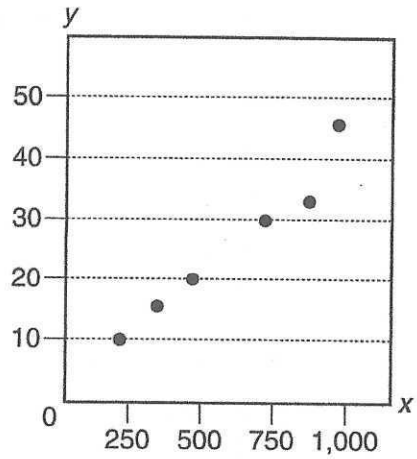


association: _____

prediction for y when x is 1,000:

_____

3.

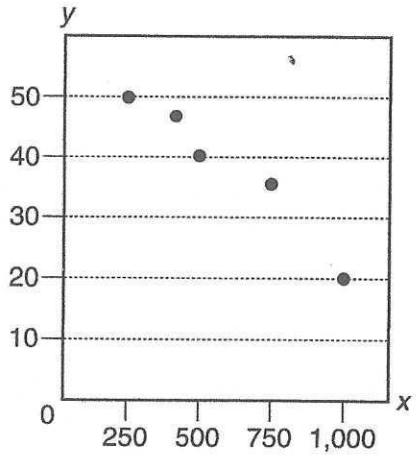


association: _____

prediction for y when x is 600:

_____

4.



association: _____

prediction for y when x is 850:

_____

Predicting:

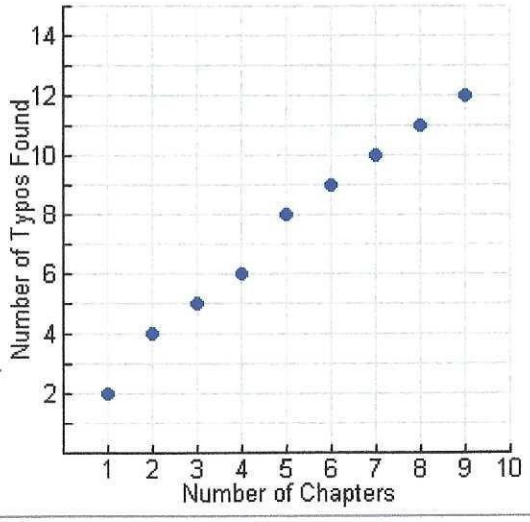
- If you are looking for values that fall within the plotted values, you are ***interpolating.***
- If you are looking for values that fall outside the plotted values, you are ***extrapolating.*** **Be careful** when extrapolating. The further away from the plotted values you go, the less reliable is your prediction.

(1) The scatter plot at the right shows the number of chapters in a book in relation to the number of typos found in the book. If you predict the number of typos that would occur in a book containing 12 chapters, you would be:

Choose:

A) extrapolating

B) interpolating



(2)

If you were asked to interpolate information from this graph, you would have to be careful to limit the number of chapters to:

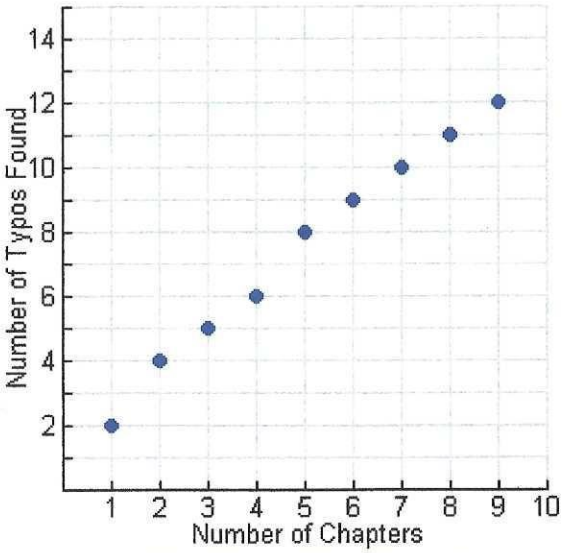
Choose:

A) between 2 and 8 chapters

B) between 1 and 9 chapters

C) chapters 2, 4, 6, and 8 only

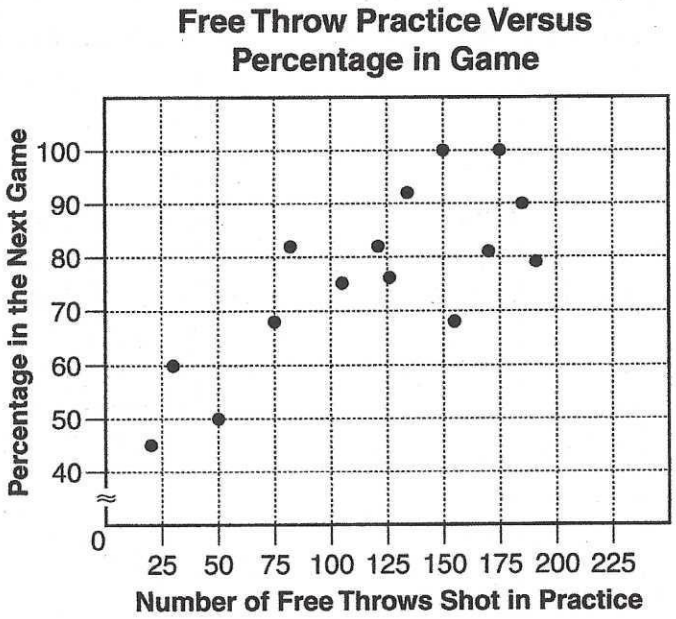
D) there is no need to limit chapters



CCSS: 8.SP.1, 8.SP.2

Directions: Use the following information to answer questions 1 through 4

Joey kept track of the number of free throws that his team shot in practice and the percentage that they made in the next game. He displayed his findings in the scatter plot shown below.



1. Draw a trend line on Joey's scatter plot.

2. Does the trend line show a negative, positive, or no association?

_____

3. Does the trend line show a linear association or a nonlinear association?

_____

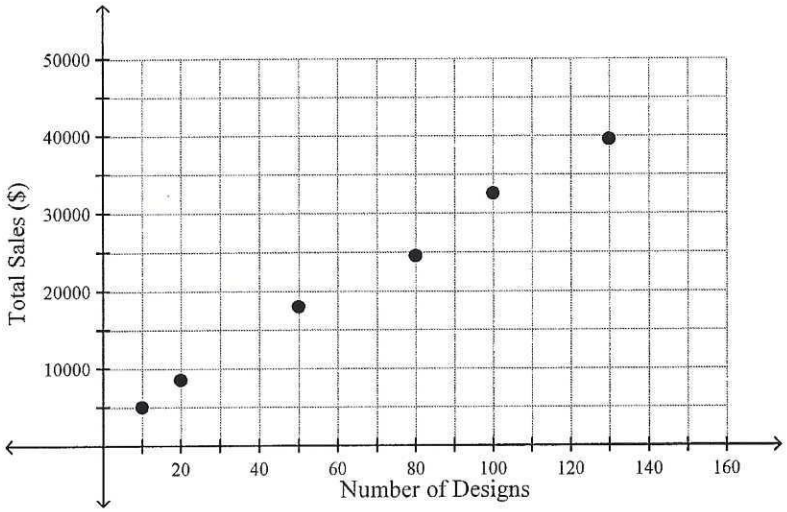
4. A student takes 60 free throws during practice. Predict the free throw percentage that the student is likely to have during the next game.

_____

is 60 interpolating or extrapolating? _____

Name: _____ ID: A

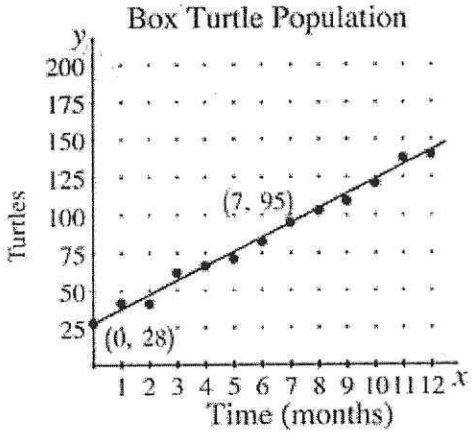
__ 1) The scatter plot shows the relationship between the weekly total sales ($) and the number of different rug designs a rug store has. Based on this relationship, predict what the total sales will be when the store has 110 different rug designs.



*is 110 interpolating or extrapolating?

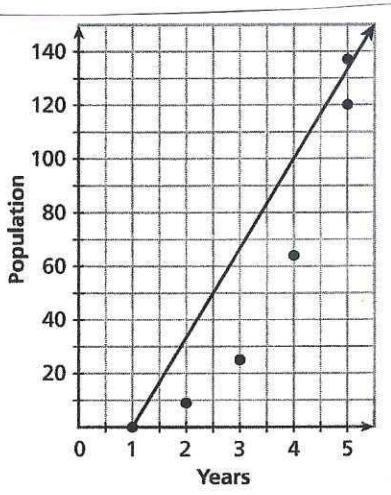
a. $31,000
b. $0
c. $38,000
d. $35,000

___ 2) In the scatter plot, a line has been drawn to show the trend in a population of box turtles over a period of twelve months. Estimate the population of box turtles after 9 months.



is 9 interpolating or extrapolating?

3) **Error Analysis** Carl graphed the data shown in the scatter plot and then drew a trend line. Why is a trend line not a good fit for this data?



Write true or false for each statement. If false, rewrite the statement so it is true.

1) A straight line is a good model for a scatter plot that shows a nonlinear association.

_____

2) A trend line should always pass through at least two actual data points on a scatter plot.

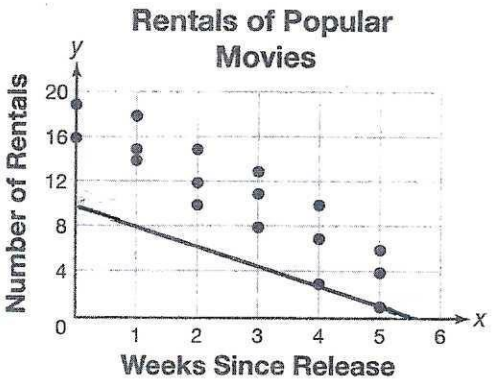
_____

3) A trend line will never include a point that is an outlier for a data set.

_____

Solve.

4) **DRAW** The scatter plot shows the numbers of times different popular movies were rented and the number of weeks since the release of each movie.

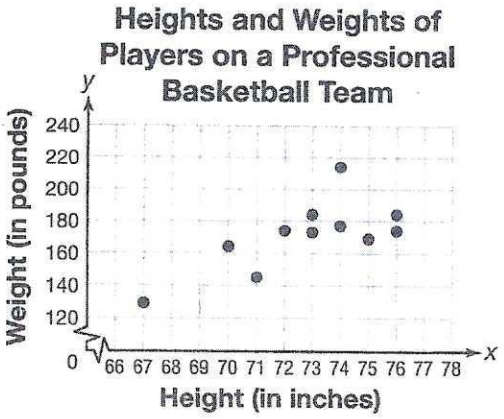


Is the line drawn a good model for the data? If not, draw a better model. Explain.

_____

_____

5) **EXPLAIN** The scatter plot shows the heights and weights of players on a professional basketball team. Draw a line of best fit for the data.



Based on your line, would you expect a professional basketball player who is 77 inches tall to weigh 140 pounds? Explain.

_____

_____