

Name Ker
Mrs. Roubos

★ use
Learn Billie

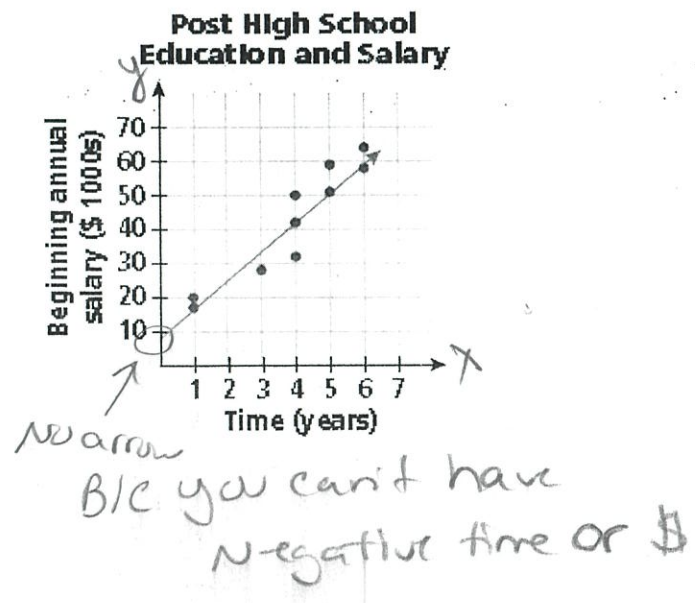
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Line of Best fit

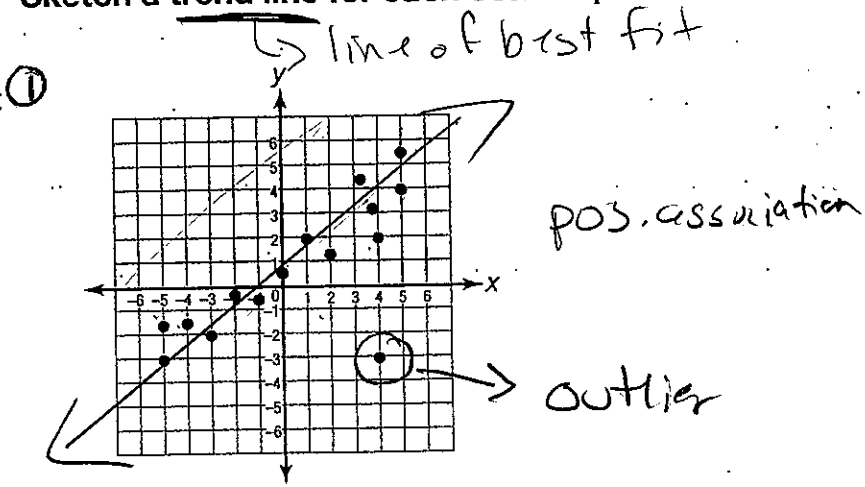
When data is displayed with a scatter plot, it is often useful to attempt to represent that data with the equation of a straight line for purposes of predicting values that may not be displayed on the plot.

Such a straight line is called the "line of best fit."
It may also be called a "trend" line.

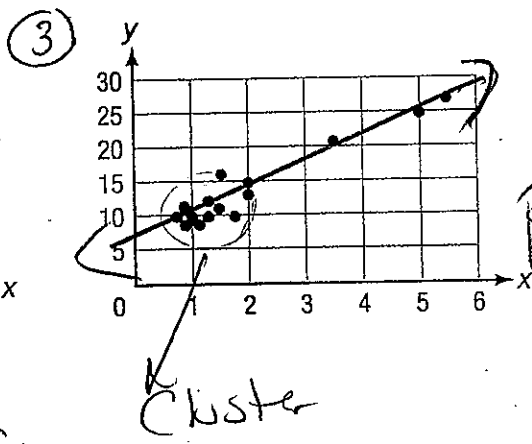
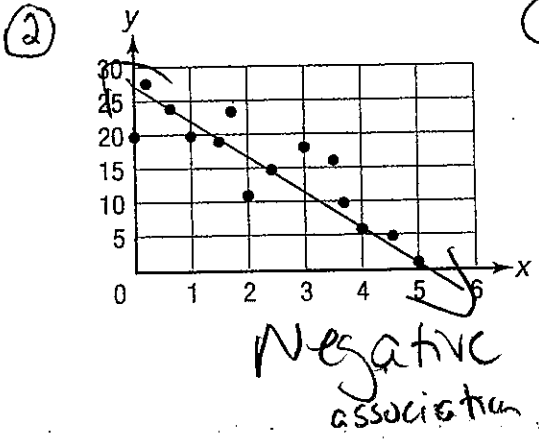
A line of best fit is a straight line that best represents the data on a scatter plot.
This line may pass through some of the points, none of the points, or all of the points.



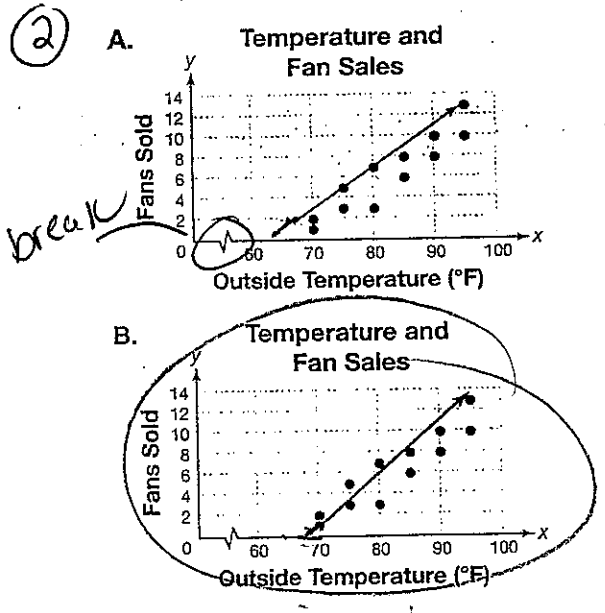
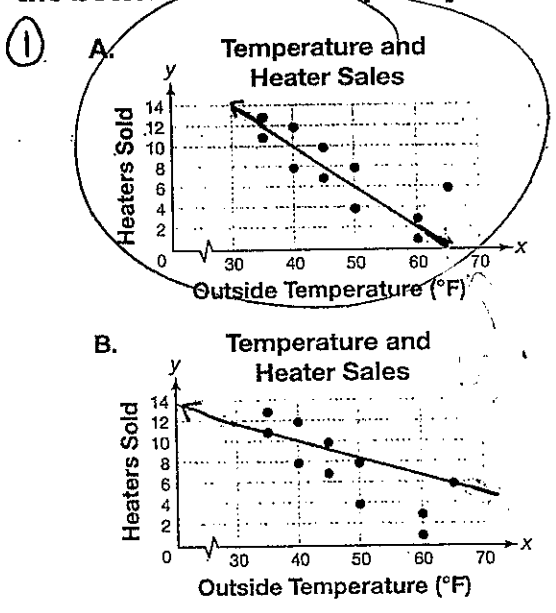
Sketch a trend line for each scatter plot.



Ask Yourself
How can I draw a line that includes as many points as possible?



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



the line is more in the middle of the dots

the line is more in the middle of the dots

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

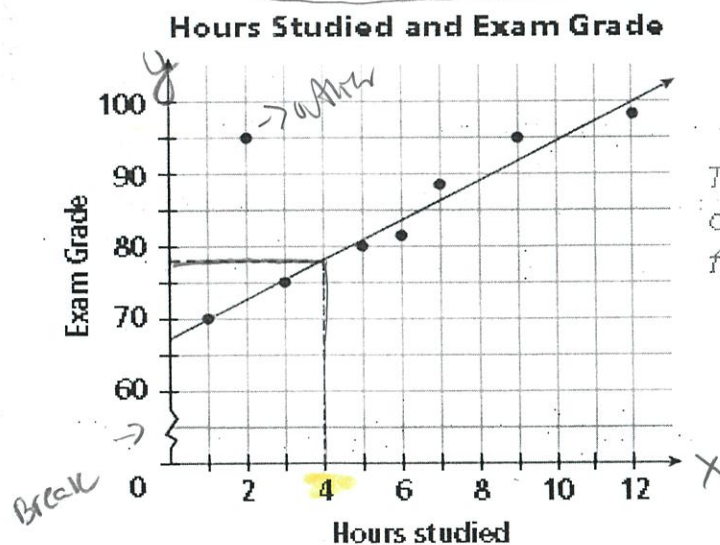
Step 1: Make a scatter plot.

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.

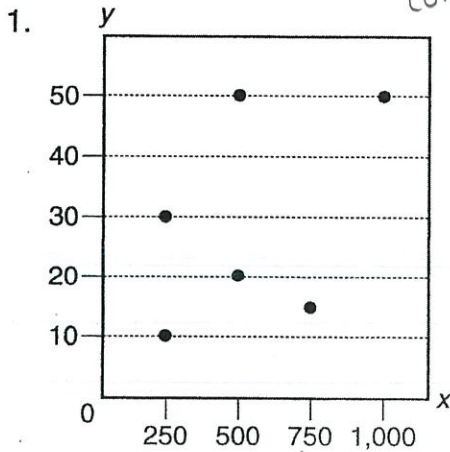
According to the graph, a student who studies 4 hours per week should earn a score of about 78.

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

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.

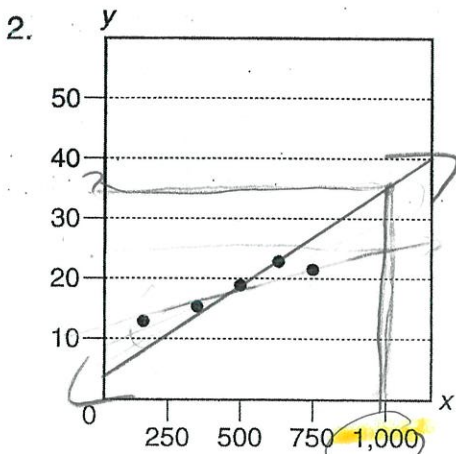
AKA Correlation Relationship



association: NO association

prediction for y when x is 300:

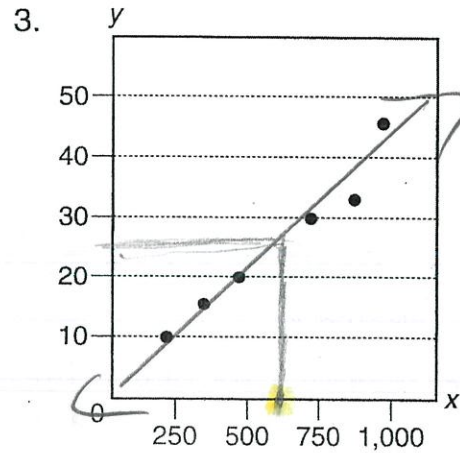
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association: Positive

prediction for y when x is 1,000:

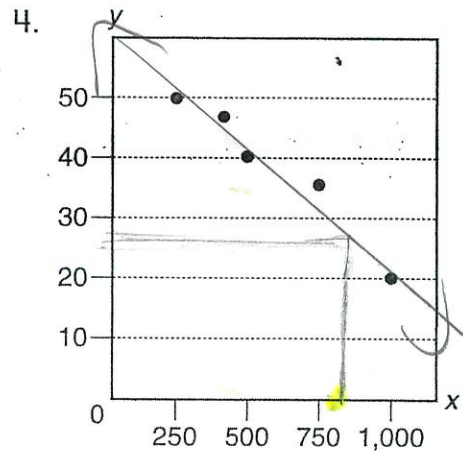
y ≈ 35



association: Positive

prediction for y when x is 600:

y ≈ 26



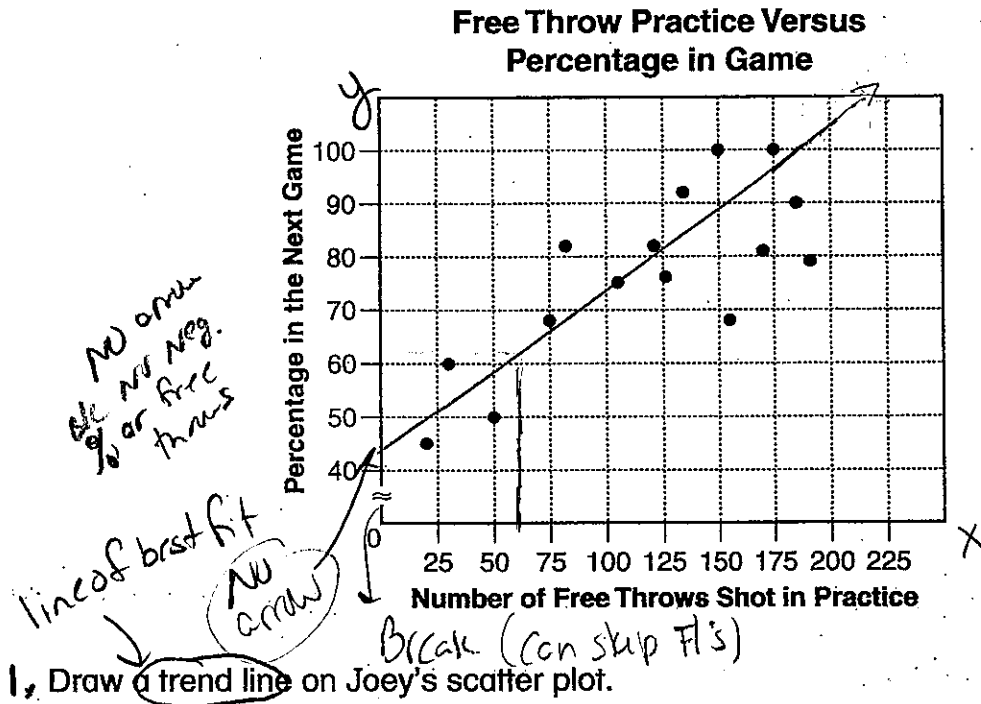
association: Negative

prediction for y when x is 850:

y ≈ 28

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?

Positive

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

linear

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.

≈ 61%

is 60 interpolating or extrapolating? interpolating

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

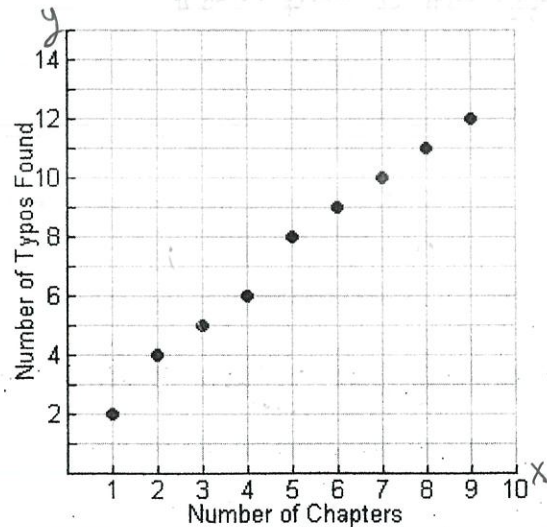
The scatter plot at the right shows the number of chapters in a book in relation to the number of typos found in the book. If you predict the number of typos that would occur in a book containing 12 chapters, you would be:

Choose:

A) extrapolating

B) interpolating

outside



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:

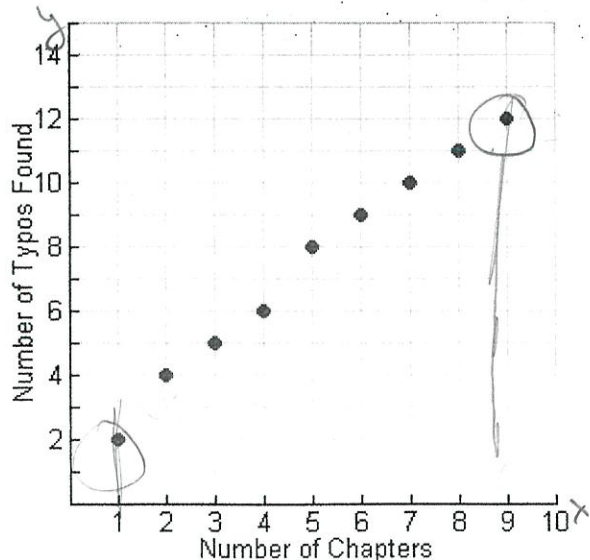
A) between 2 and 8 chapters

B) between 1 and 9 chapters

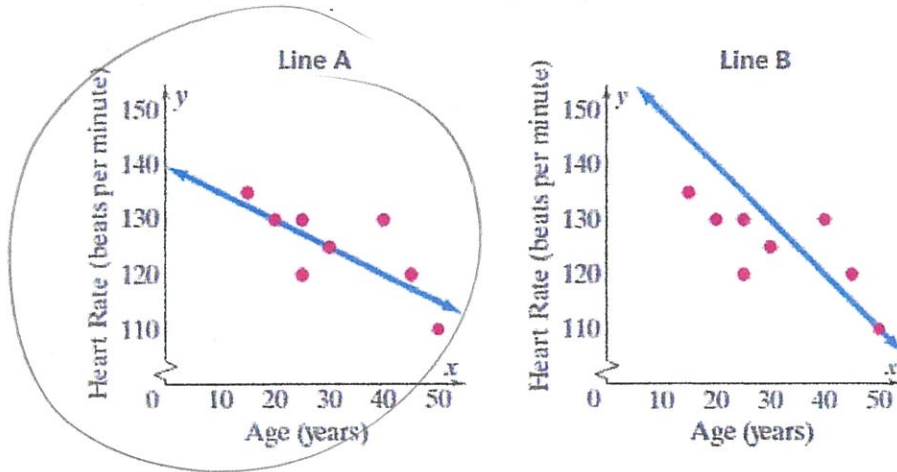
C) chapters 2, 4, 6, and 8 only

D) there is no need to limit chapters

inside

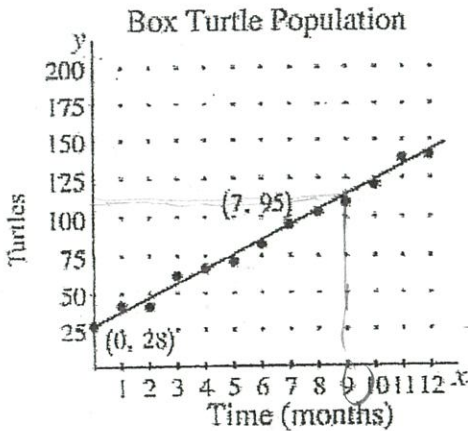


1) The scatter plots below display the same data about the ages of eight health club members and their heart rates during exercises. Which line of best fit is better? Explain.



The line is more in the middle of the dots and a better representation of the data

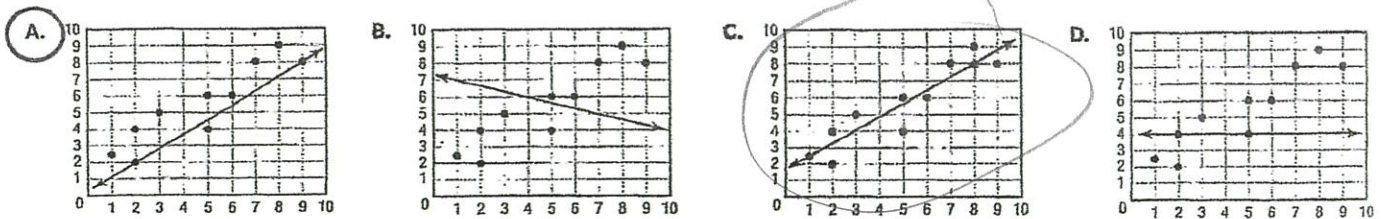
2) In the scatter plot, a line has been drawn to show the trend in a population of box turtles over a period of twelve months. Estimate the population of box turtles after 9 months.



is 9 interpolating or extrapolating?

≈ 115

3) The 8th Grade Math Assessment asked, "Which of the following choices displays the most appropriate trend line for the scatter plot?" Gabby answered by circling choice A. Why is her answer incorrect?



Choice A is too below the dots. Choice C is better b/c it is in the middle of the dots and a better representation of the data

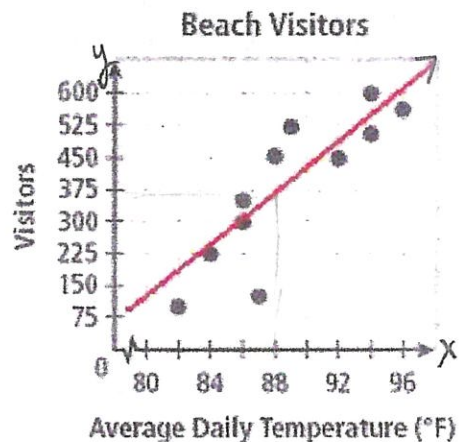
4) The scatterplot below shows the relationship between the number of beach visitors and the air temperature.

Based on the TREND LINE, how many visitors would you expect to visit the beach when the temperature is 88 degrees?

375 visitors

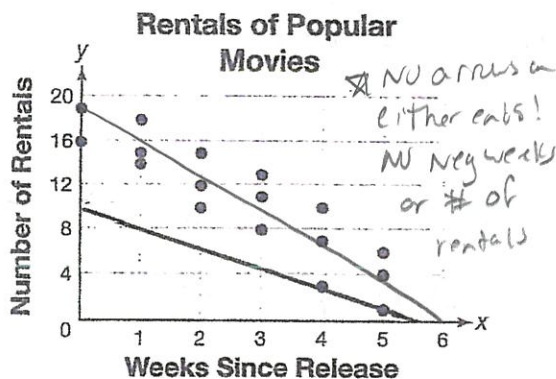
Does the temperature of 88 degrees represent interpolating or extrapolating?

Interpolating!



Solve.

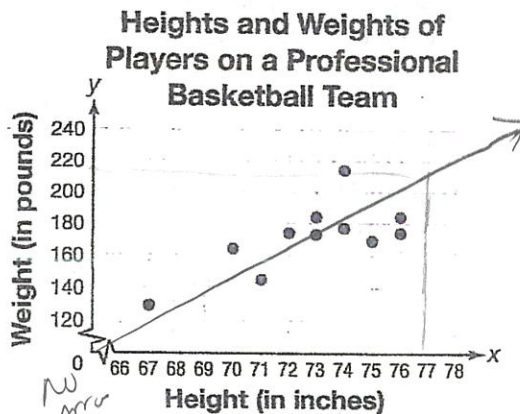
5) **DRAW** The scatter plot shows the numbers of times different popular movies were rented and the number of weeks since the release of each movie.



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

It is not a good fit b/c the line is not in the middle of the dots

6) **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.

No! It is ≈ 210 lbs
extrapolating b/c 77 is outside the plotted dots