

Warm Up

10/22

Write the equation of the line with slope = $\frac{4}{3}$ and passes through the point (4, 5).

$$\begin{aligned} 5 &= \frac{4}{3}(4) + b \\ 5 &= \frac{16}{3} + b \\ -\frac{16}{3} & \quad -\frac{16}{3} \\ \hline -\frac{1}{3} &= b \\ y &= \frac{4}{3}x - \frac{1}{3} \end{aligned}$$

How to clear a denominator out of a problem:

$$\begin{aligned} y &= \frac{4}{3}x + b & (4, 5) \\ 5 &= \frac{4}{3}(4) + b \\ 3 \left[5 = \frac{16}{3} + b \right] & \\ 15 &= 16 + 3b \\ -16 & \quad -16 \\ \hline -1 &= \frac{3b}{3} \\ -\frac{1}{3} &= b \end{aligned}$$

Try this—

$$3 \left[3(4x - 1) = \frac{2}{3}x + 2 \right]$$

$$9(4x - 1) = 2x + 6$$

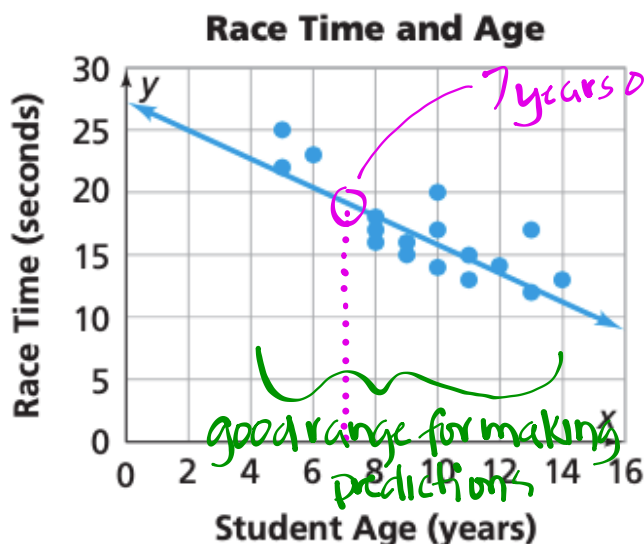
$$\begin{array}{r} 36x - 9 = 2x + 6 \\ +9 \quad +9 \end{array}$$

$$\begin{array}{r} 36x = 2x + 15 \\ -2x \quad -2x \\ \hline \end{array}$$

$$\begin{array}{r} 34x = 15 \\ 34 \quad 34 \end{array}$$

$$x = \frac{15}{34}$$

4.2 Recap



$$\frac{\Delta y}{\Delta x} = -\frac{5}{4}$$

Unit Rate

$$= -\frac{1.25}{1}$$

For every 4 years older
race time decreases by
5 seconds.

For every 1 year older
race time decreases by

1.25 seconds

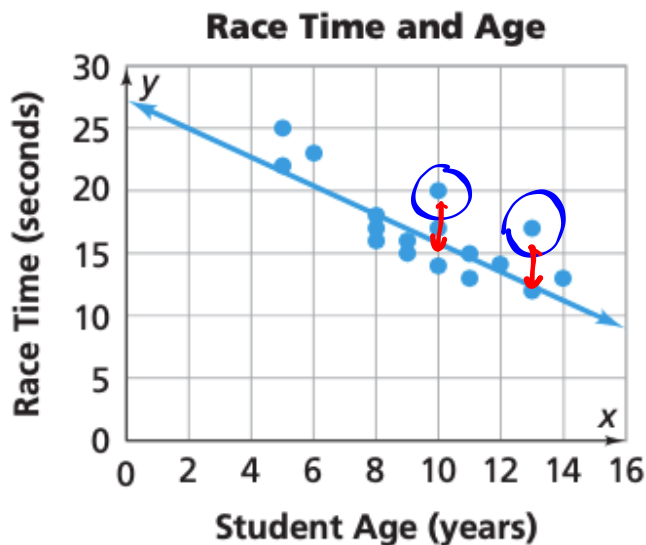
Problem 4.2

Use the Race Time and Age graph.

- A** The line drawn on the graph models the relationship between age and race time.
1. What is the approximate slope of the line?
 2. How does the slope help you understand the relationship between age and race time?
 3. Do you think it makes sense to predict a race time for a 7-year-old student using the line? If so, what do you predict for a 7-year-old? How confident are you in your prediction?
 4. Do you think it makes sense to predict a race time for a 21-year-old person using the line? If so, what do you predict for a 21-year-old? How confident are you in your prediction?

Yes

Good for predictions
between 5 and 14 years



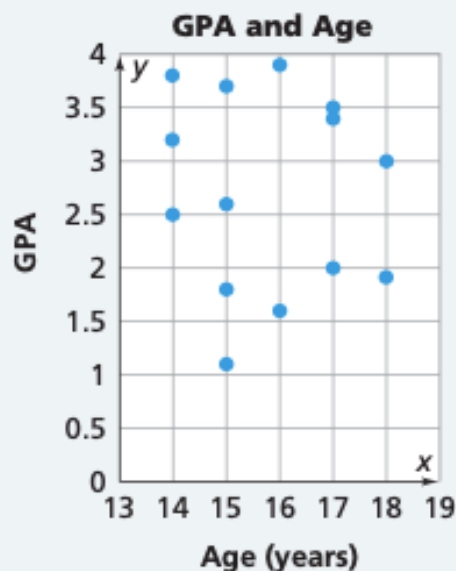
Outliers - far from the line of best fit

Problem 4.2 *continued*

- B** Some data points are very close to the line while others are far from it. The points far from the line don't seem to fit the model.
1. Find two points that don't seem to fit the model. What are their coordinates (age, race time)?
 2. Why do you think the points don't match the overall pattern? Explain. Think about the relationship between race time and age.

- C** The table and graph show age and grade point average (GPA) for 14 students at Magnolia High School.

Student Age (years)	14	14	14	15	15	15	15	16	16	17	17	17	18	18
GPA	2.5	3.2	3.8	1.8	2.6	3.7	1.2	1.6	3.9	2.0	3.4	3.5	1.9	3.0



No relationship

1. Are age and GPA strongly related for these students? Explain.
2. How is your answer to part (1) supported by the table?
3. How is your answer to part (1) supported by the scatter plot?

Association

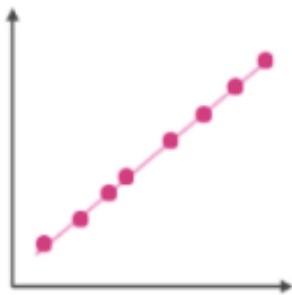
An indication that two variables may be related to each other.

Correlation

How strongly two variables are related to each other.

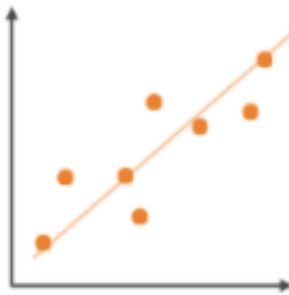
Positive Correlation

↘ Positive slope (increasing)



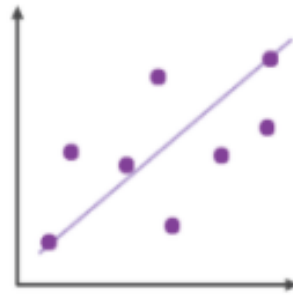
Strong
Positive

$$r = .99$$



Positive

$$r = .87$$



Weak
Positive

$$r = .7$$

r = Correlation Coefficient,
a measure of how strong a relationship is.

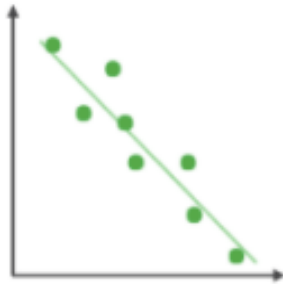
Negative Correlation

↘ Negative Slope (decreasing)



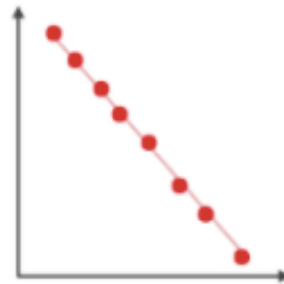
Weak
Negative

$$r = -0.87$$



Negative

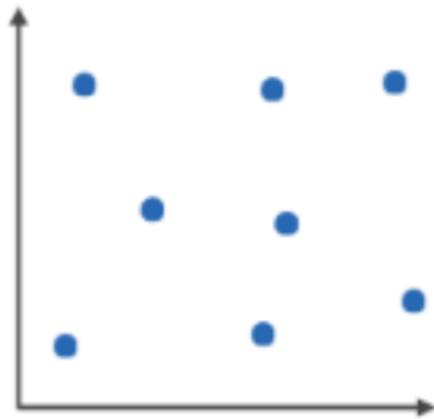
$$r = -0.95$$



Strong
Negative

$$r = -.99$$

No Correlation



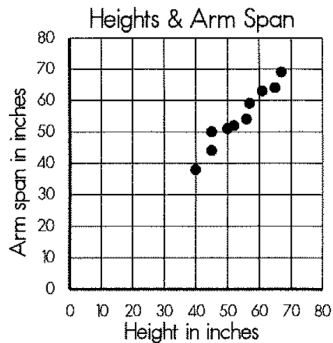
Name: _____

MAKING PREDICTIONS FROM SCATTER PLOTS

Worksheet

Use the scatter plots below to answer the questions.

1.

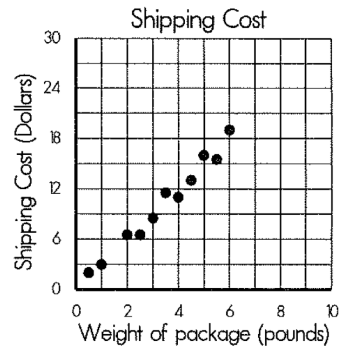


Type of Association: _____

Description: As height increases, arm span _____ (increases/decreases)

What would you expect the arm span to be for someone with a height of 75 inches?

2.

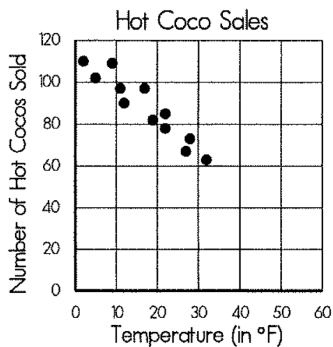


Type of Association: _____

Description: As the weight increases, the cost _____ (increases/decreases)

What would you expect the weight to be for a package that costs \$24 to ship?

3.

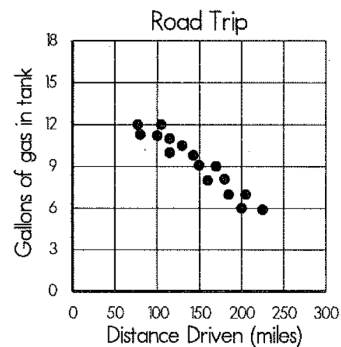


Type of Association: _____

Description: As the temperature increases, hot coco sales _____ (increase/decrease)

How many hot coco sales would you expect when the temperature is 40 degrees?

4.

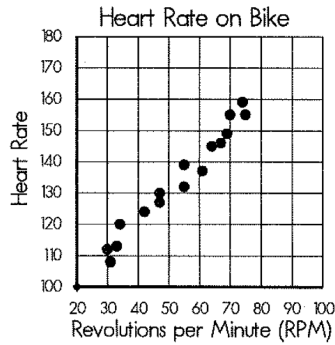


Type of Association: _____

Description: As distance driven increases, the gallons of gas _____ (increase/decrease)

How many gallons of gas would you expect to be in a gas tank after 250 miles driven?

5.

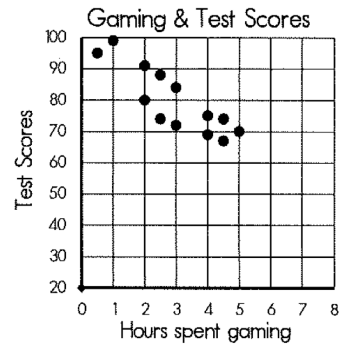


Type of Association: _____

Description: As RPM increases, heart rate _____ (increases/decreases)

What RPM would you expect someone to be going if they had a 170 BPM heart rate?

6.

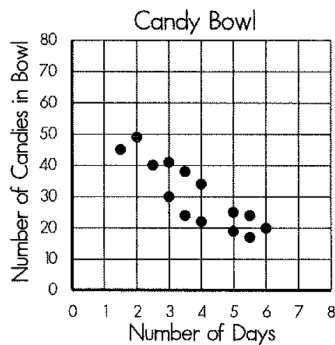


Type of Association: _____

Description: As the hours spent gaming increase, test scores _____ (increase/decrease)

What test score would you expect someone to get if they spent 6 hours gaming?

7.

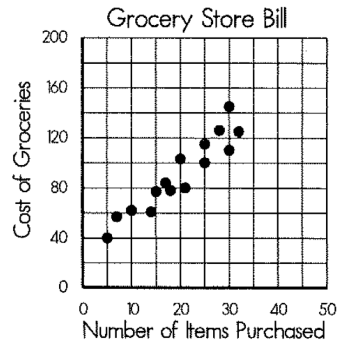


Type of Association: _____

Description: As the number of days increase, the number of candies _____ (increase/decrease)

How many candies would you expect to be in the bowl on day 7?

8.

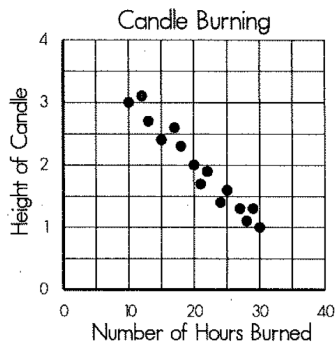


Type of Association: _____

Description: As the number of items increase, the cost _____ (increases/decreases)

How many items would you expect someone to have bought if their bill was \$180?

9.



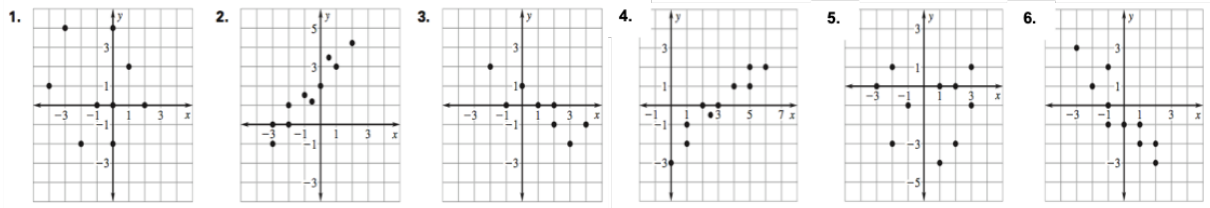
Type of Association: _____

Description: As the hours increase, the height of the candle _____ (increases/decreases)

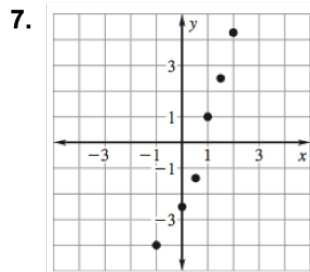
After how many hours would you expect the candle to be completely burned out?

4.4 Best-Fit Lines Worksheet

For 1–6, state the type of correlation that each scatter plot depicts.



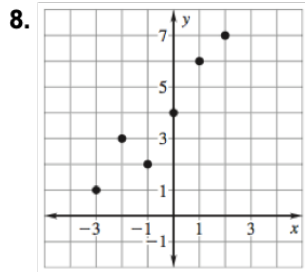
For 7–9, use a ruler to draw a best-fit line through the data. Calculate the slope (show work!) and state the y-intercept of the line you drew. Then write the equation of your best-fit line.



m: _____

b: _____

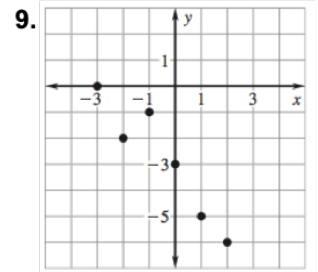
best-fit equation



m: _____

b: _____

best-fit equation



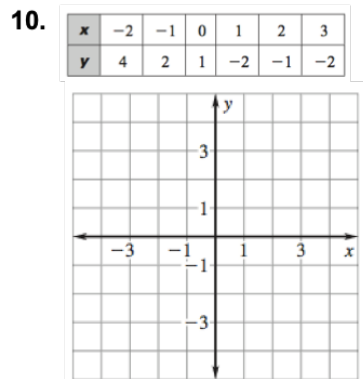
m: _____

b: _____

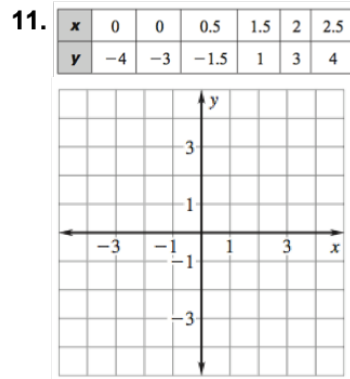
best-fit equation

Remember: Calculated LoBF's can vary between you and your table mates.

For 10–11, plot the points from the table. Then use a ruler to draw a best-fit line through the data and write the equation of the line. Use the space to show your work.



best-fit equation



best-fit equation

Homework

Finish classwork