



Name _____ Period _____ Date _____

Vocabulary: Define each word and give an example.

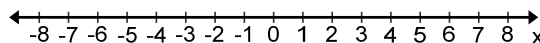
1. Correlation
2. Residual plot
3. Translation

Short Answer:

4. Statement: If a strong correlation is present between two variables, causation is present. Do you agree or disagree with this statement? Explain.
5. What values can the correlation coefficient, r , take? How can we tell if the correlation is weak, moderate or strong?

Review:

6. Find the linear equation that passes through the points $(2, -3)$ and $(5, 3)$ and write your answer in slope-intercept form.
7. Solve the formula $A = P(1 + rt)$ for r .
8. Solve and graph the inequality. $3x - 7 \leq 8x + 8$



Problems:

Be sure to show all work used to obtain your answer. Circle or box in the final answer.

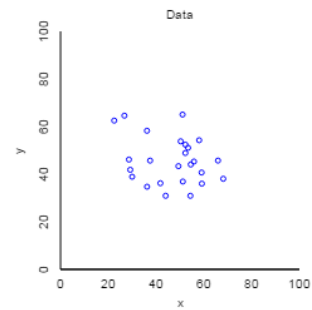
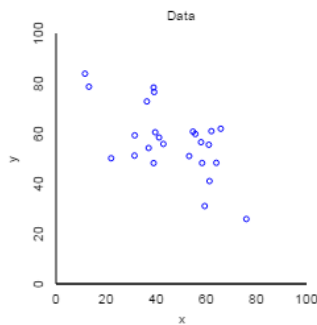
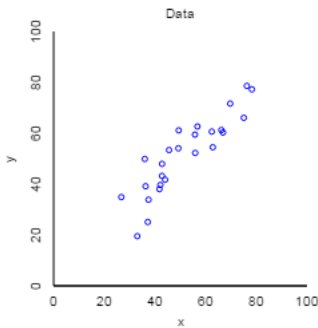
9. Let $f(x) = 2x + 4$. If $g(x)$ is a vertical stretch of 3 units and a horizontal translation 6 units left, what is the rule for $g(x)$?



10. Let $f(x) = 2x + 4$. If $g(x)$ is a reflection across the x -axis and a vertical translation up of 5 units, what is the rule for $g(x)$?

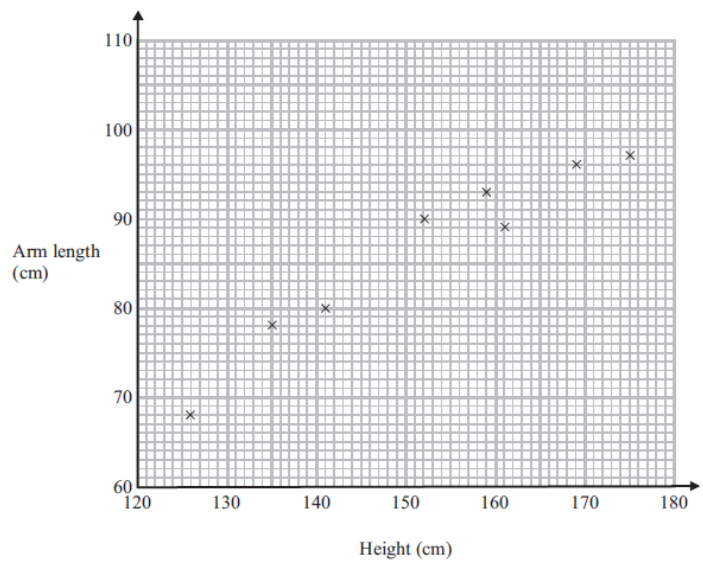
11. Using the two equations $y = \frac{1}{2}x - 3$ and $5x - 2y = 12$, compare their slopes and y -intercepts. Make sure to discuss steepness and vertical displacement.

12. Describe the correlation of the following scatterplots. Make sure to discuss direction, form and strength. Then, estimate the value of r , the correlation coefficient.



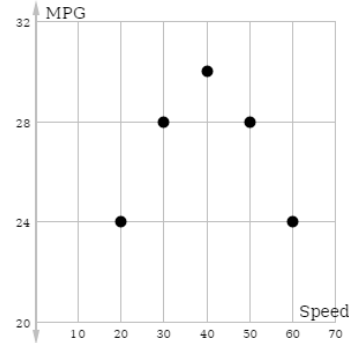
13. The scatter plot shows information about the height and the arm length of each of 8 students.

- Describe the correlation.
- Use the scatter plot to estimate the arm length of a student that is 148 cm.
- On the graph, draw the best line of fit.
- Find the equation of your best fitting line.





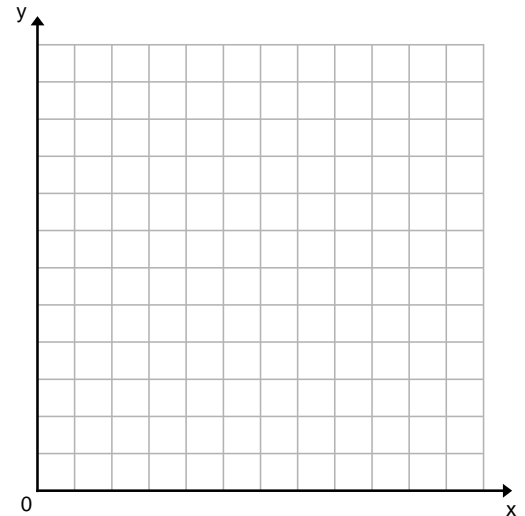
14. The gas mileage of an automobile first increases and then decreases as the speed increases. Suppose that this relationship is very regular as shown in the scatter plot below. Even though there is a strong relationship between speed and mileage, explain why the value of r is 0.



15. Sarah's parents are concerned that she seems short for her age. Their doctor has the following record of Sarah's height:

Age (months)	36	48	51	54	57	60
Height (cm)	86	90	91	93	94	95

- Draw a scatter plot of the data.
- Using your calculator, find the equation of the least-squares regression line.
- Using the LSRL, predict Sarah's height at 42 months of age.
- Let's say that Sarah was **actually** 87 cm at 42 months of age. Find the residual associated with this data point.
- Using your calculator, find the correlation coefficient and INTERPRET it.
- Interpret the slope of your equation in the CONTEXT of the problem.
- Does the y-intercept have meaning in context for this data? Explain.

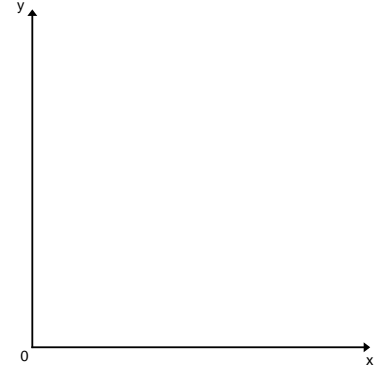




16. The following data describes the total fat grams and total calories of fast food sandwiches at a local fast food restaurant.

Total Fat (g)	9	13	21	30	31	31	34	25	28	20	5
Total Calories	260	320	420	530	560	550	590	500	560	440	300

a. Graph the data in your calculator and SKETCH the scatterplot here:



b. Find the LSRL for the data.

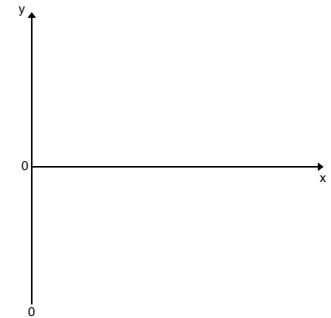
c. Find the correlation coefficient and interpret it.

d. Describe the slope in the context of this problem.

e. Interpret the y-intercept in the context of the problem.

f. Predict the total calories for a sandwich that has 17 fat grams.

g. Plot the residual plot in your calculator and sketch it below.
Do you think that a linear model is appropriate for this data?
Use your residual plot to explain your answer.



17. Would you expect a *positive correlation*, a *negative correlation*, or *no correlation* between the two data sets. Explain why.

a. the number of calories burned and the time spent exercising

b. the length of a baby at birth and the month in which the baby was born

c. the weight of a newly born child and the number of cigarettes the child's mother smokes a day



18. Is there a causal relationship in the following situations? Explain.
- the depth of a snowfall and the amount of time spent clearing the driveway
 - the number of cavities and the size of an elementary student's vocabulary
19. Identify the independent variable and the dependent variable in the following situations:
- increase in pressure with depth below sea level
 - the number of papers delivered and the amount of money earned

Multiple Choice Question: **Circle the best answer.**

20. A set of data has correlation coefficient, r . For which value of r would the data points lie closest to a line?
- $r = -0.96$
 - $r = 0$
 - $r = 0.56$
 - $r = 0.28$
21. Which of these describes the transformation in terms of $f(x)$?
Horizontal translation 6 units left.
- $f(x) - 6$
 - $-6f(x)$
 - $f(x + 6)$
 - $f(x - 6)$
22. Which equation best describes the fit of the data shown in the scatterplot?
- $y = -\frac{3}{5}x + 7$
 - $y = -\frac{1}{3}x + 8$
 - $y = x + 8$
 - $y = 4$

