



Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

## CALCULATOR SECTION

Vocabulary: Define each word and give an example.

1. Residual Plot
2. Correlation Coefficient
3. y-intercept of a linear model

Short Answer:

4. If there is curvature in the residual plot, what does this tell us?
5. When describing a scatterplot, what do we look for?

Review:

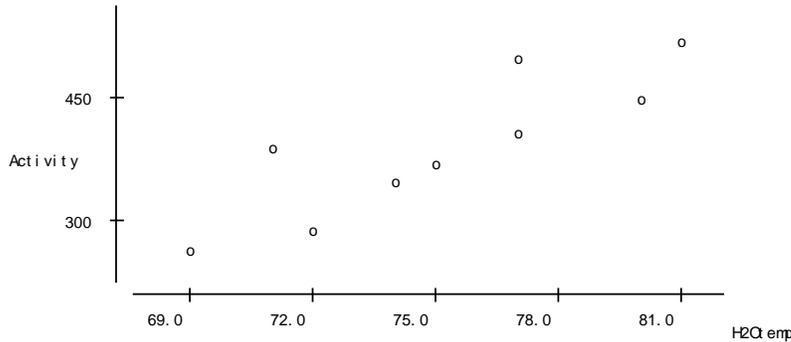
6. Find the equation in slope-intercept form for the line that passes through  $(-3, 4)$  and  $(5, 8)$ .
7. Let  $f(x) = 2x - 5$  and  $g(x) = -8x + 12$ . Find  $f(g(x))$ .
8. Find the inverse of the function  $f(x) = 2x - 3$ .
9. The graph of  $y = |x|$  is reflected in the y-axis, shifted 4 units right and 2 units down. The equation of the transformation is:

Problems:

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



Joey read in his biology book that fish activity increases with water temperature, and he decided to investigate this issue by conducting an experiment. On nine successive days, he measures fish activity and water temperature in his aquarium. Larger values of his measure of fish activity denote more activity. The figure below presents the scatterplot of his data.



1. What does the scatterplot reveal? State in plain language as if you were explaining to a friend who knows very little statistics.

2. What is your best **guess** for the correlation coefficient ( $r$ ) of the scatterplot above. \_\_\_\_\_

3. Using your guess above, describe the correlation coefficient.

4. Sketch your best fit line on the scatterplot and then write the equation of your line. Estimate your points.

Studies have shown that people who suffer sudden cardiac arrest have a better chance of survival if a defibrillator shock is administered very soon after cardiac arrest. The following data give the call-to-shock time in minutes and the survival percentage rate of patients at a cardiac rehabilitation center.

<b>Time (minutes)</b>	2	3	5	6	7	8	9	11
<b>Survival rate (%)</b>	90	70	55	45	30	8	5	4

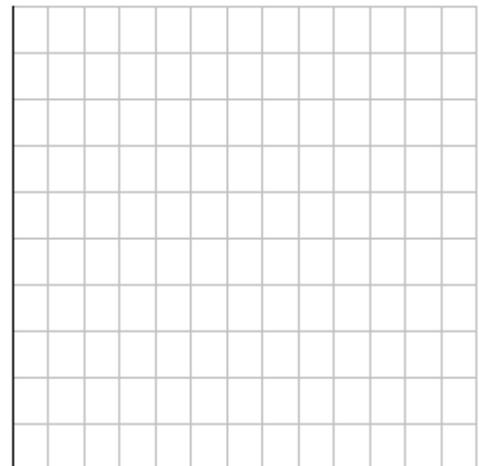
5. Make a scatterplot of the data **by hand**.  
Make sure to label the axes & use nice/appropriate scaling!!

6. Determine the equation of the LSRL for this data using your TI-84.

Define your variables:

$x =$

$\hat{y} =$



7. Explain in **simple language** what this plot says about the two variables.



8. What is the slope? Define the slope in the context of this problem .

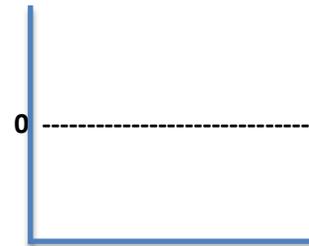
9. Calculate  $r$ , the correlation coefficient, using your calculator.

$r =$  \_\_\_\_\_

10. Now interpret the  $r$  you found using the words discussed in class.

11. Predict what the survival percentage rate would be for 4 minutes. \_\_\_\_\_

12. Plot the residual plot on your calculator and sketch it here:  
Do you feel that a linear model is appropriate? Why or why not?



Multiple Choice Questions:

A study gathers data on the outside temperature during the winter, in degrees Fahrenheit, and the amount of natural gas a household consumes, in cubic feet per day. Call the temperature  $x$  and gas consumption  $y$ . The house is heated with gas, so  $x$  helps explain  $y$ . The least-squares regression line is  $\hat{y} = 1344 - 19x$ . **The next three questions concern this line.**

13. On a day when the temperature is  $20^\circ\text{F}$ , the regression line predicts that gas used will be about

(a) 1344 cubic feet      (b) 964 cubic feet      (c) 1306 cubic feet      (d) 1054 cubic feet

(e) None of these

14. When the temperature goes up  $1^\circ\text{F}$ , what happens to the gas usage predicted by the regression line?

- (a) It goes up 1 cubic foot.
- (b) It goes down 1 cubic foot.
- (c) It goes down 19 cubic feet.
- (d) It goes up 19 cubic feet.
- (e) Can't tell without seeing the data.

**15.** An engineer at General Motors collects data on the weights (in pounds) and the fuel economy (in miles per gallon) of all model year 2000 cars sold by GM. We expect the correlation between weight and gas mileage to be

- (a) clearly positive
- (b) close to zero
- (c) clearly negative
- (d) can't tell because correlation is random
- (e) can't tell because correlation depends on the average fuel economy of these cars.

**16.** Which of the following statements about correlation is not true?

- (a) A correlation coefficient of  $-0.87$  between two quantitative variables indicates a stronger linear relationship than a correlation coefficient of  $0.71$ .
- (b) If the correlation between two quantitative variables is  $0$ , then there is no relationship between the variables.
- (c) A correlation of  $-0.77$  between students' scores on a reading test and the age when they first spoke means that as age of first spoken word increases test score decreases.
- (d) Even if the correlation between two quantitative variables is  $-1$ , we cannot conclude that increases in one variable cause decreases in the other.
- (e) Adding a single unusual point on a scatter plot can dramatically increase or decrease the correlation coefficient.