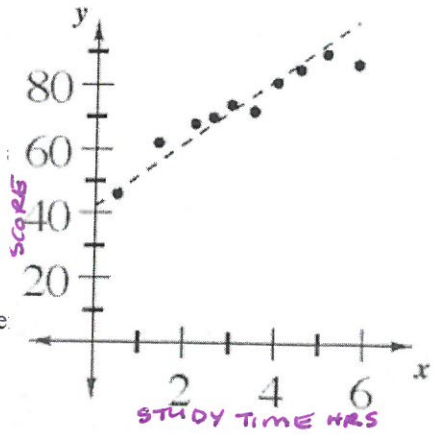
Name:_____ Date:_____

Unit 2 Stats Practice Test

1) A teacher had 10 students keep track of their study time for the semester final. The following table lists their study time in hours and their percentage score on the test.



X Study Time (hrs)	Y Score
1.4	62
5.8	87
4.5	85
2.6	70
3.5	72
0.5	46
3.0	74
4.0	81
2.2	68
5.1	90

a. On separate graph paper, make a scatter plot of the data. Does the data appear to follow any pattern?

YES A LINEAR PATTERN

b. Draw a smooth line that represents the data.

c. Find the equation for your line.

$y = 10x + 42$

d. According to your model, how many hours would a student need to study in order to earn a score of 95 on the test. Explain how you arrived at your prediction.

$95 = 10x + 42$

$53 = 10x$

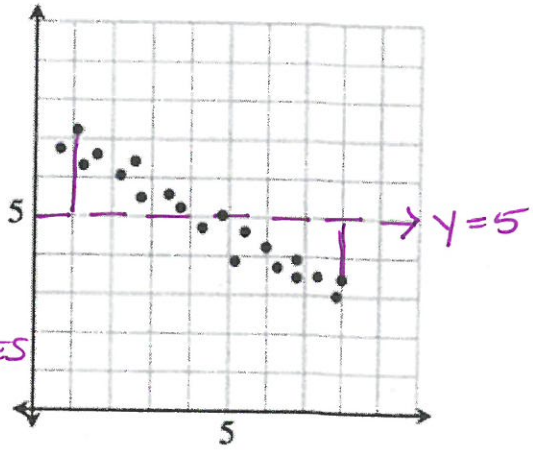
$5.3 = x$

About 5.3 hours of study time can earn you a 95 score.

2) When Mr. Loudon told the class to find a model to represent the data shown at right, Lazy Larry was finished in seconds. "*There!*" Lazy Larry exclaimed. "*You can't be done already!*" exclaimed his brother Darryl. "*Yes, I am,*" Lazy Larry stated emphatically. "*But how could you find an equation so quickly? You didn't even have time to think!*" Darryl presses. "*Look,*" Lazy Larry begins. "*Mr. Loudon wants a model, right? So here's my model!*" and Lazy Larry shows Darryl the equation $y = 5$. "*But that's not a model!*" Darryl retorts with disbelief. "*Why yes it is,*" Lazy Larry calmly replies.

What do you think? Is the equation $y = 5$ a model for this data?

Be clear and complete while analyzing Lazy Larry's "model".



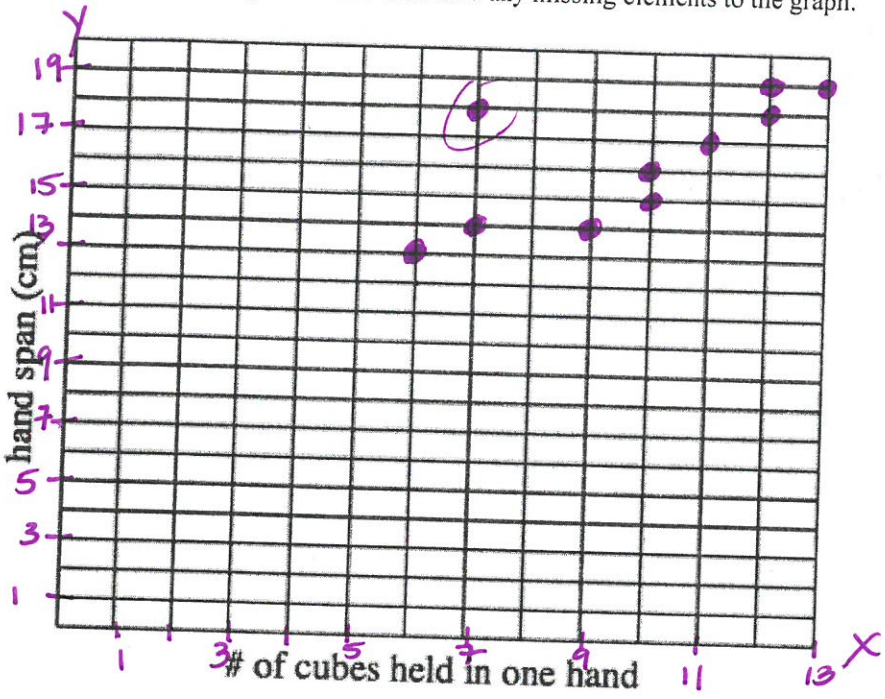
$Y = 5$ IS NOT A GOOD LINEAR MODEL BECAUSE...

- SUM OF THE SQUARES OF THE RESIDUALS IS NOT MINIMIZED
- SOME POINTS ARE FAR AWAY

3) A math class measured hand span (the distance from thumb to little finger in an outstretched hand) and the number of cubes that the person could hold in one hand.

Student	Number of Cubes Held in One Hand (X)	Hand Span (cm) (Y)
A	7	14
B	12	17
C	10	16
D	13	19
E	6	13
F	9	14
G	7	18
H	10	15
I	11	17
J	12	18

a. Create a scatterplot for this data. Add any missing elements to the graph.



b. What is the relationship between hand span and the number of cubes held in one hand? Is the association positive, negative, or is there no association?

THE LARGER A PERSON'S HAND THE MORE CUBES THEY CAN HOLD. IT'S A POSITIVE CORRELATION.

c. Which point appears to be an outlet?

THE POINT (7, 18) APPEARS TO BE AN OUTLIER

4) Consider the two different class sets of test scores for the same test:

Class 1	77, 79, 75, 80, 74, 77, 75, 78, 78, 71, 79, 80, 78, 65, 80, 80, 83, 60, 80, 90, 78, 55, 93, 83, 70, 78, 78, 80, 79, 77
Class 2	77, 78, 76, 79, 75, 77, 75, 78, 78, 79, 75, 80, 74, 78, 76, 81, 81, 82, 76, 75, 74, 73, 74, 84, 76, 75, 73, 55, 93, 83

Who did better on the test? Why? Justify your analysis and conclusion completely. Include all measures of central tendency and the standard deviation for each set of data and compare and contrast them to make your determinations.

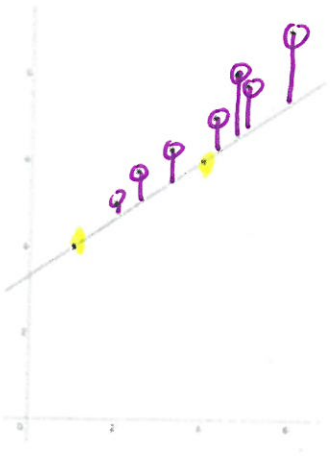
YOU SHOW WORK:

- BOTH CLASSES HAVE A MEAN OF 77, MAX OF 93 AND MIN OF 55, AND BOTH CLASSES EACH HAVE 30 STUDENTS
- STANDARD DEVIATION FOR CLASS 1 ≈ 7.4 BUT FOR CLASS 2 ≈ 5.8 WHICH MEANS MORE TEST SCORES ARE CLOSER TO THE AVERAGE FOR CLASS 2. CLASS 1 HAS MORE SPREAD.
- MEDIAN FOR CLASS 1 = 78 BUT FOR CLASS 2 = 76.5 MORE STUDENTS SCORED HIGHER IN CLASS 1

5) Xavier, Yolanda, and Zeke are all trying to find a line of best fit for data they collected together. Below are the graphs each student created using the same scatterplot. Comment on the success or failure of each person's attem2.) The graph at right shows data points and a line of best fit. With a solid line, draw in the positive residuals, and with a dashed or dotted line, draw in the negative residuals. Are there any residuals equaling zero? Explain.

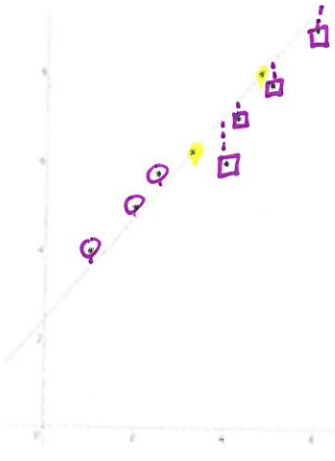
○ POSITIVE
□ NEGATIVE

↑ ZERO RESIDUAL BECAUSE A - P = 0



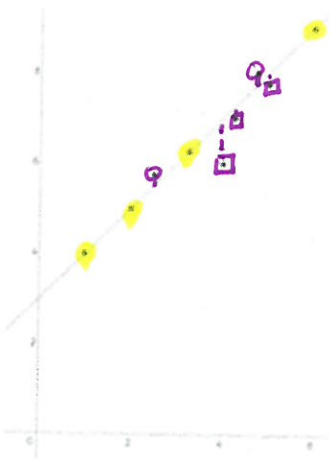
Xavier's Graph

High RESIDUAL Sum of squares Not a good LSRL



Yolanda's Graph

good LSRL

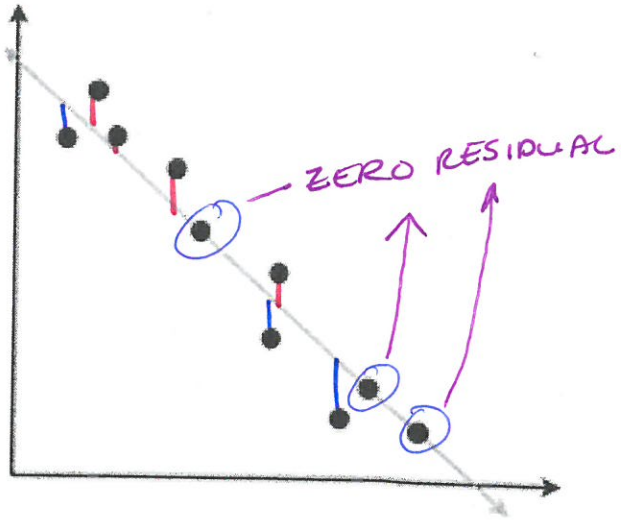


Zeke's Graph

good LSRL

6) The graph at right shows data points and a line of best fit. With a solid line, draw in the positive residuals, and with a dashed or dotted line, draw in the negative residuals. Are there any residuals equaling zero? Explain.

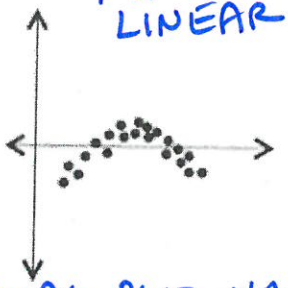
A ZERO RESIDUAL OCCURS WHEN THE LINE OF BEST FIT GOES THROUGH THE DATA.



7) For each residual plot below, describe what you know about the model used with its scatterplot to produce the residual plot shown. Be clear and complete.

a.

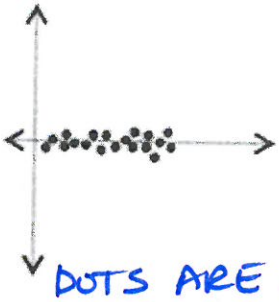
NON-LINEAR



RESIDUAL PLOT HAS A SHAPE THEREFORE THE LSRL MODEL IS NOT THE BEST ONE FOR THE DATA

b.

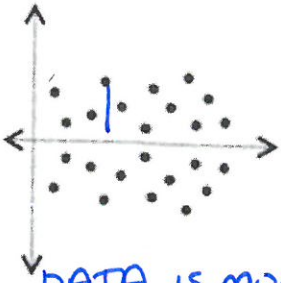
LINEAR



DOTS ARE CLOSE TO THE X-AXIS => SMALL RESIDUALS LSRL IS A VERY GOOD MODEL

c.

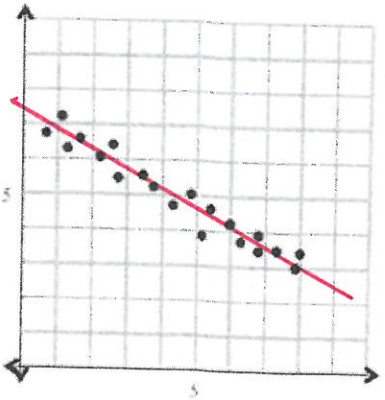
LINEAR



DATA IS MORE SPREAD OUT, NO SHAPE, THE LSRL IS A GOOD MODEL

8) How would you describe the association in the graph of data at right? Be clear and complete!

LINEAR, NEGATIVE, STRONG, NO OUTLIERS



9) Is there a relationship between the fat grams and the total calories in fast food?

The chart below shows the total fat and calories for fast food items.

Total Fat g	Total Calories	Predicted Value	Residual Value
9	260	272.4	-12.4
13	320	325.2	-5.2
21	420	430.8	-10.8
30	530	549.6	-19.6
31	560	562.8	-2.8
31	550	562.8	-12.8
34	590	602.4	-12.4
25	500	483.6	16.4
28	560	523.2	36.8
20	440	417.6	22.4

a) Calculate the least squares regression line using the graphing calculator.

$y = 13.2x + 153.6$

b) Use the LSRL to complete the chart.

c) Create a residual plot for the model.

d) Is a linear regression a good model for this data. Explain.

SOME POINTS ARE FAR AWAY FROM THE X-AXIS, ALTHOUGH THERE IS NO SHAPE OR PATTERN. AN LSRL MAY BE A GOOD MODEL.