The Basketball Star - Is Bob or Alan a Basketball Star?

Bob's Points per Game

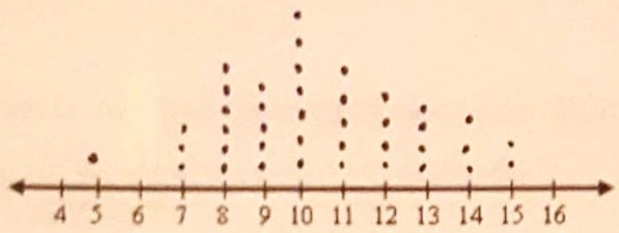
8, 15, 10, 10, 10, 15, 7, 8, 10, 9, 12, 11, 11, 13, 7, 8, 9, 9, 8, 10, 11, 14, 11, 10, 9, 12, 14, 14, 12, 13, 5, 13, 9, 11, 12, 13, 10, 8, 7, 8

Alan's Points per Game

1, 3, 0, 2, 4, 5, 7, 7, 8, 10, 4, 4, 3, 2, 5, 6, 6, 6, 8, 8, 10, 11, 11, 10, 12, 12, 5, 6, 8, 9, 10, 15, 10, 12, 11, 11, 6, 7, 7, 8

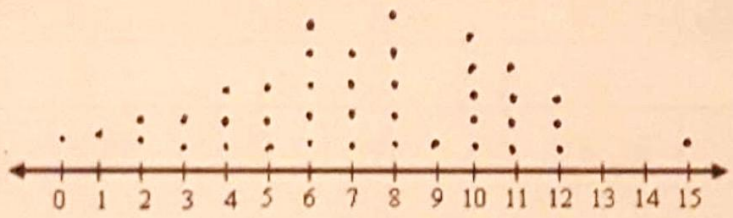
1. Create a dot plot for Bob and Alan.

Bob:



Bob's Points

Alan:



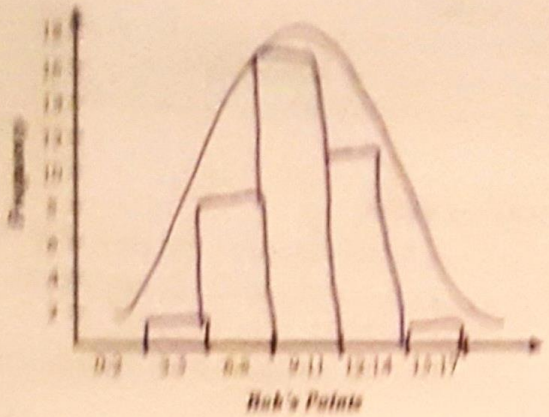
Alan's Points

2. Describe the spread (more or less variation) and unusual features (gaps or outliers), if any.

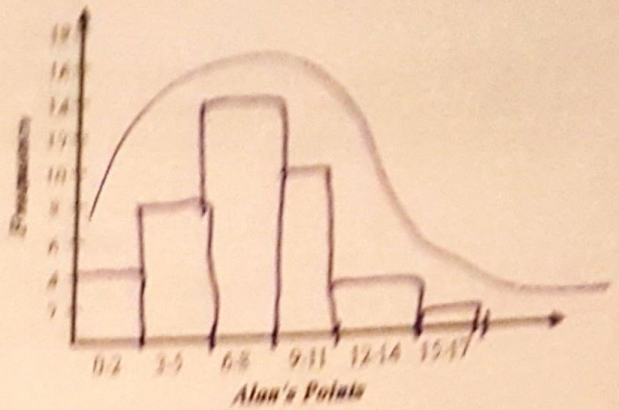
Bob's data has less *variation and Alan's data has* more *variation. For unusual features, Bob's data has a(an)* outlier *and Alan data has a(an)* outlier.

3. Create histograms for both Bob and Alan's data.

Interval	Bob	Alan
0-2	/	4
3-5	1	8
6-8	9	14
9-11	17	10
12-14	11	3
15-17	2	1



Bob's Points



Alan's Points

4. Describe the shape (~~left skewed, right skewed, symmetric, or bimodal~~) of the two histograms above.

The histogram from Bob's point is symmetric and the histogram from Alan's points is right skewed

5. Use summary statistics to compare Bob and Alan's points per game.

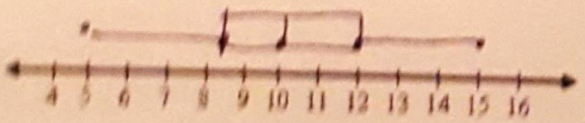
	Min	Quartile 1 (Q1)	Median	Quartile 3 (Q3)	Max	Mean	Range (Max – Min)	IQR (Q3 – Q1)
Bob	5	8.5	10	12	15	10.4	10	3.5
Alan	0	6	7	10	15	7.25	15	5

6. Based on the summary statistics is either friend a basketball star? Justify your answer.

Bob, looking at the mean, it was a better average, but the range & IQR for Bob was smaller

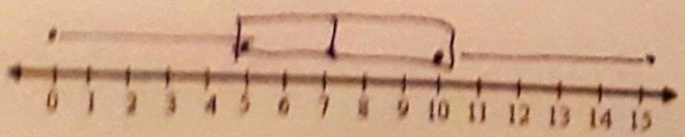
7. Create a box and whisker plot from the data above.

Bob:



Bob's Points

Alan:



Alan's Points

Algebra 1 Scatter Plots

What is a scatter plot?

A graph of data in two variables on a coordinate plane, where each data pair is represented by a point. The independent variable (the variable that ISN'T influenced by anything) is on the x-axis and the dependent variable (the one that is affected by the independent variable) is plotted on the y-axis.

Patterns of Data in Scatter Plots

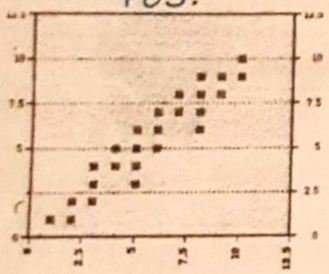
If y tends to increase as x increases, then the data have positive correlation.

If y tends to decrease as x increases, then the data have negative correlation.

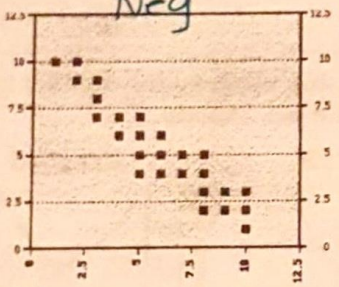
A correlation coefficient, denoted by r, is a number from -1 to 1 that measures how well a line fits a set of data pairs (x, y).

- If r is near 1: strong positive. If r = 1: perfect positive
- If r is near -1: strong negative. If r = -1 perfect negative
- If r is near 0: weak pos/neg. If r = 0 no correlation.

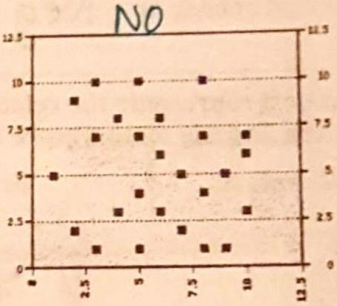
Pos.

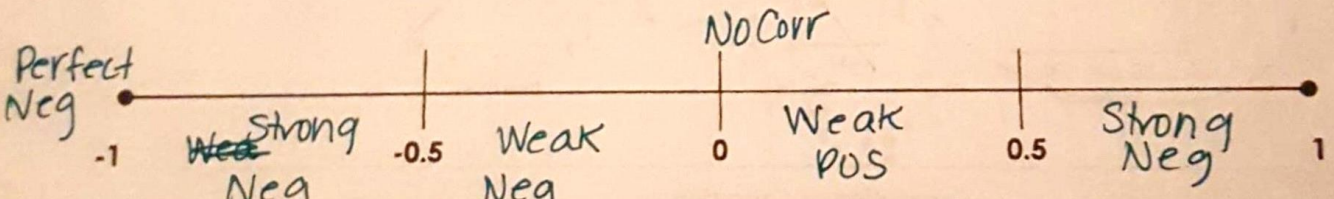


Neg



No

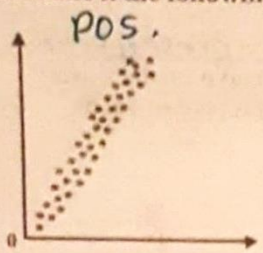


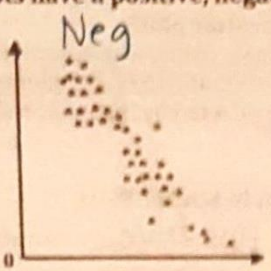


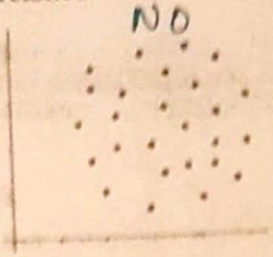
Classify as strong positive, weak positive, strong negative, weak negative, perfect positive, perfect negative, or no correlation.

1. r = -0.375 WN
2. r = 0.21 WP
3. r = 1 PP
4. r = 0 NC
5. r = 0.973 SP
6. r = -1 PN
7. r = -0.899 SN

Determine if the following scatter plots have a positive, negative, or no correlation.







Identify the correlation you would expect to see (positive, negative, or none) between the pair of data sets. Explain.

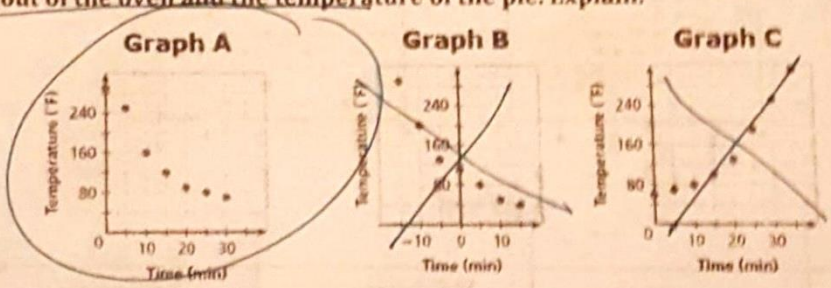
1. The average temperature in a Pi-town and the number of speeding tickets given in Pi-town None

2. The number of people in the audience for a Taylor Swift concert and the ticket sales Positive

3. The temperature in Atlanta and the number of cars sold in Philadelphia None

4. Amount of exercise and percent of body fat Neg

Choose the scatter plot that best represents the relationship between the number of minutes since a pie has been taken out of the oven and the temperature of the pie. Explain.



Correlation vs. Causation

When a scatter plot shows a correlation between two variables, even if it's a strong one, there is *not necessarily a cause-and-effect relationship.*

Example 1: Mr. Jones gave a math test to all the students in his school. He made the startling discovery that the taller students did better than the short ones. He states: *As your height increases, so does your math ability.*
Type of Correlation? Pos. Causation? Yes (based on statement)

Example 2: *The more you eat out, the more money you spend at restaurants.* Type of Correlation? Neg
Causation? Yes

3. When you are on a diet, the less calories you eat daily vs. the more weight you lose. Causation statement: *Therefore, eating less calories makes you lose weight.* Correlation? Neg Causation? Yes

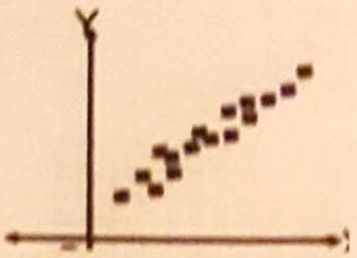
4. The more ice cream consumed on a beach vs. the increased number of people who go in the water. Causation statement: *Therefore, eating more ice cream on the beach makes people go in the water.* Type of Correlation? Pos. Causation? Yes (based on statement)

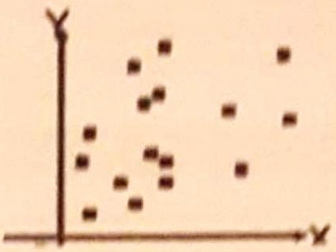
Correlation and Shape of Distributions
Graded Assignment

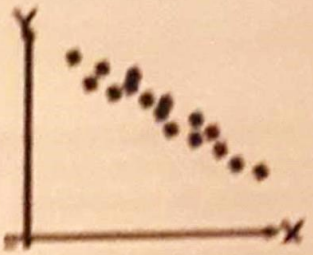
Name Key
Date _____ Period _____

For 1-3, Describe the correlation: Positive (P), negative (N) , or No Correlation (NC).

1. P 2. NC 3. N





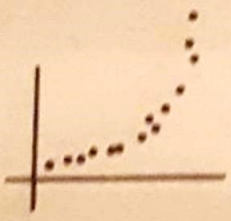


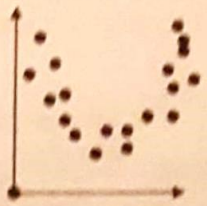
For 4-10, Classify as Strong Positive (SP), Weak Positive (WP), Strong Negative (SN), Weak Negative (WN), Perfect Positive (PP), Perfect Negative (PN), or No correlation (NC).

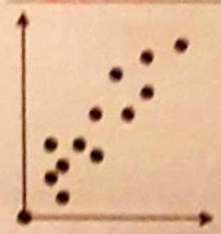
4) $r = -0.425$ WN
5) $r = 0$ NC
6) $r = -1$ PN
7) $r = -0.725$ SN
8) $r = 0.351$ WP
9) $r = 1$ PP
10) $r = 0.823$ SP

For 11 – 13, Given the scatter plot, what is the best type of function to represent the data: Linear, Quadratic, or Exponential.

11) Exp 12) Quad 13) Linear







For 14 &15: Tell whether the following situations are causation (Write YES or NO).

14) The number of boats on Lake Allatoona and the number of cars on the street NO

15) The hours you work and the money you make (you get paid hourly) Yes

For 16-18, Determine if the following situations represent a positive, a negative, or no correlation.

16) Number of hours studying for the SAT and your score. Pos.

17) The distance you drive and the number of stars in the sky. NC

18) A person's age and the hair on their head. Neg

A

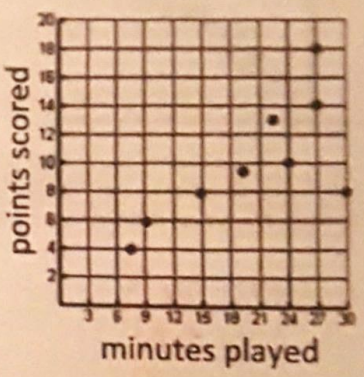
19) Between which of the following variables would you expect there to be a negative correlation?

A. The outside temperature and the number of layers of clothing a person wears
B. A person's height and weight
C. The amount of time spent studying and a test grade
D. The number of years spent in school and salary

B

20) The data to the right represents the amount of time of play and the number of points scored by one player in a recent basketball game. Which statement best summarizes the relationship?

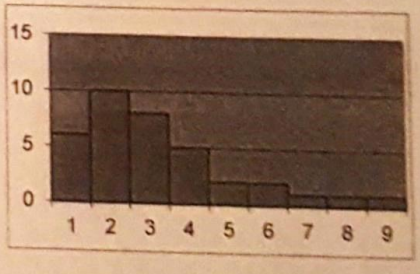
A. The more time they practice, the more they play in the game.
B. The longer he/she plays, the fewer points they score.
C. The player scores less, because he/she is playing longer.
D. As the total points scored goes down, so does the length of play.



D

21) Which is the best description of the distribution?

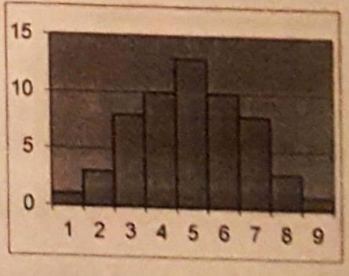
A. Bimodal
B. Symmetric
C. Skewed Left
D. Skewed Right



B

22) Which is the best description of the distribution?

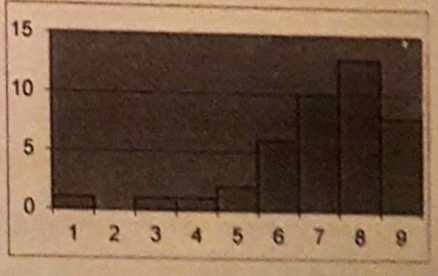
A. Bimodal
B. Symmetric
C. Skewed Left
D. Skewed Right



C

23) Which is the best description of the distribution?

A. Bimodal
B. Symmetric
C. Skewed Left
D. Skewed Right



C

24) What type of correlation does the following have? *The age of a person vs. The last four digits of their phone number.*

A. Positive Correlation
B. Negative Correlation
C. No Correlation