

### Correlation and Causation Homework

1. From the information given,  
a. Determine if the correlation is positive, negative or none.

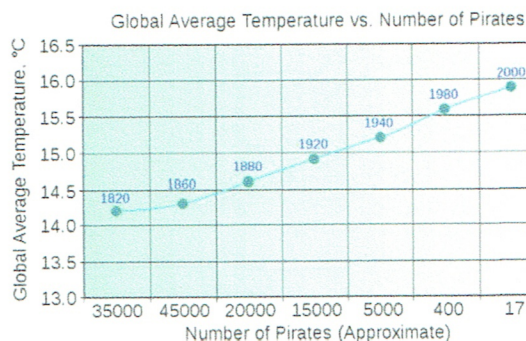
**Positive** It goes up as it goes to the right

- b. Estimate the correlation coefficient.  
**1** Starting at the 2<sup>nd</sup> data point, it's a pretty straight line

- c. Is there causation? Why or why not?

**Probably not. I'm not aware of any pirate's**

**ability to affect the weather.** I'm less concerned with the yes/no answer than your having a clear justification for it



2. A history teacher asked her students how many hours of sleep they had the night before a test. The data above shows the number of hours the student slept and their score on the exam. The graph is a scatter plot from the given data.

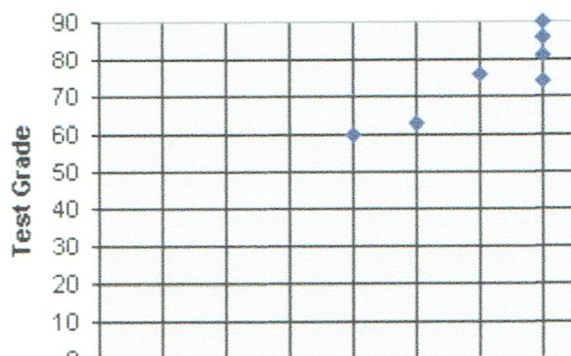
- a. Determine if the correlation is positive, negative, or none. **Positive**

- b. Estimate the correlation coefficient. **0.5**

- c. Is there causation? Would this information affect your behavior the night before a test?

**Probably yes. In many cases, yes.**

History Grades In Relation To Ho



3. The following chart shows violent crime rates compared to high school graduation for all fifty states.

- a. Determine if the correlation is positive, negative, or none.

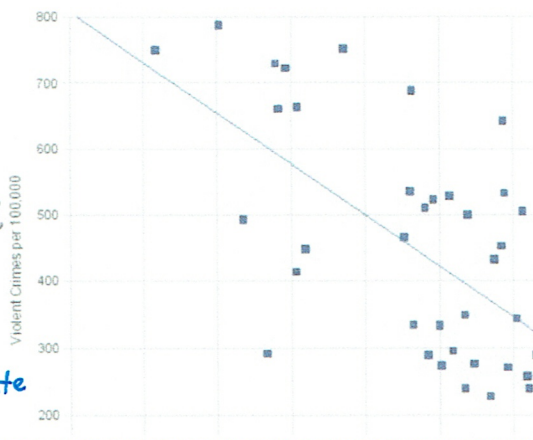
**Negative** It goes down as it goes to the right

- b. Estimate the correlation coefficient.

**-0.5** You can see the downwards trend, but it's spread out.

- c. Is this an illustration of cause and effect, or are these two variables simply correlated?


**I would say correlated. While they may have many of the same root causes, failing to graduate does, & force you to be a criminal.**



For the given situations below,

- a. Is the association positive, negative or none?
- b. Is the causation statement true or false?

4. 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.*

a.) Positive 

b.) Mostly true. Eating fewer calories will at least make you gain weight slower in most cases

5. 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.*

a.) Positive

b.) False, although both are heavily influenced by heat.

6. The more people in a family vs. the increased number of cars the family owns.  
Causation Statement: *Therefore, the more people there are in a family determines how many cars a family owns.*

a.) Positive

b.) Mostly true, although spending a lot of money for food/housing might not leave a lot of extra money for cars.

7. The average speed cars travel from Philadelphia to New York on the turnpike vs. the average amount of times it takes. Causation Statement: *Therefore, the speed cars travel from Philadelphia to New York determines the time it takes to go between them.*

a.) Negative

b.) Absolutely true.  $\text{Distance} = \text{Speed} (\text{Time})$ . Increase speed or time and the other has to decrease to compensate.

8. How much you pay for a house vs. how much you pay for a car. Causation statement: *Therefore the more you pay for a house makes you spend more for a car.*

a.) None

b.) False. If you spend all of your money on a house, you don't have any left for the car, and vice-versa. You may be prioritizing one over the other depending on your lifestyle.