Section 1.4 Worksheet – Scatterplots and Correlation vs. Causation

MDM4U
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Refer to Part 2 of the 1.4 lesson for help with the following question

1) Identify the explanatory and the response variable in a correlation study of

a) heart disease AND cholesterol level

explanatory: cholesterol level *response: heart disease*

b) hours of basketball practice AND free---throw success

explanatory: hours of basketball practice *response: free---throw success*

c) amount of fertilizer used AND height of plant

explanatory: amount of fertilizer used *response: height of plant*

d) income AND level of education

explanatory: education *response: income*

e) running speed AND pulse rate

explanatory: running speed *response: pulse rate*

Refer to Part 3 of the 1.4 lesson for help with the following question

2) Classify the direction of linear correlation that you would expect with the following pairs of variables

a) hours of study, examination score

positive

b) speed in excess of the speed limit, amount charged on a traffic fine

positive

c) hours of television watched per week, final mark in calculus

negative

d) a person's height, sum of the digits in the person's phone number

no correlation

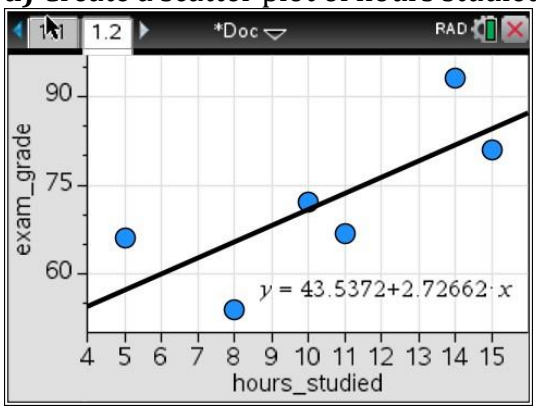
e) a person's height, the person's strength

positive

3) For a week prior to their final physics exam, a group of friends collect data to see whether time spent studying or time spent watching TV had a stronger correlation with their marks on the exam.

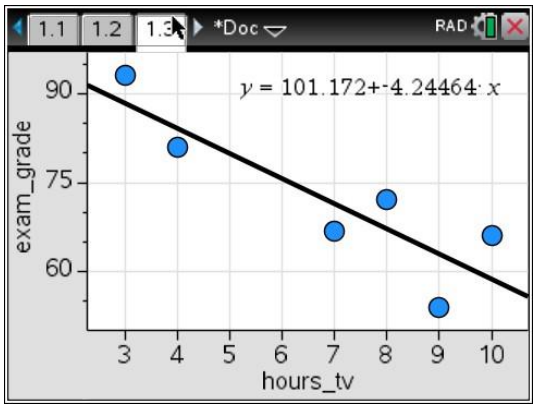
Hours Studied	Hours Watching TV	Exam Score
10	8	72
11	7	67
15	4	81
14	3	93
8	9	54
5	10	66

a) Create a scatter plot of hours studied versus exam score. Classify the linear correlation.



There appears to be a moderate to strong positive linear correlation between hours studied and exam grade. This means that the more a student studied, the higher their exam score was.

b) Create a scatter plot of hours watching TV versus exam score. Classify the linear correlation.



There appears to be a strong negative linear correlation between hours spent watching TV and exam grade. This means that the more a student watched TV, the lower their exam score was.

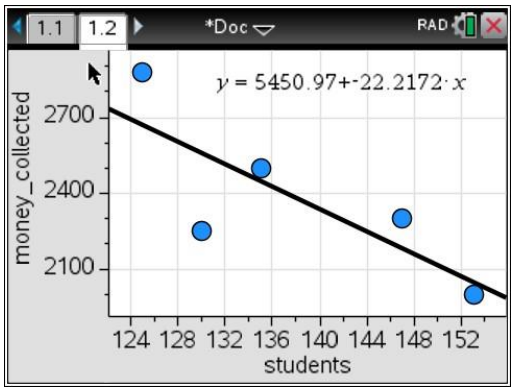
c) Which explanatory variable has a stronger correlation with exam scores? Explain.

It appears that hours spent watching TV has a stronger correlation with exam grade. The points seem less spread out indicating a stronger correlation.

4) Every year, students at a local high school collect money for a local charity. They keep track of the number of students who participate, as well as the amount of money that is collected. The information for the past five years is listed in the table below.

Year	Number of Students	Amount Collected ($)
1	130	2250
2	125	2875
3	135	2500
4	147	2300
5	153	2000

a) Create a scatterplot of the data



b) Describe the correlation that is observed in the data

There appears to be a moderate negative linear correlation between number of students participating and money collected. This indicates that the more students that participate, the less money that is collected.