Exercise 2: Statistics 213 (L05) - Fall 2007

Multiple - Choice Problems

1. The value of the correlation coefficient is always

    a. greater than or equal to 0

    b. less than or equal to 1

    c. between 0 and 1 inclusive

    d. between -1 and 1 inclusive

    e. equal to 1

2. From a given set of data, Jack found the value of the correlation coefficient of variables X and Y, $r = -0.9$. This includes that

    a. there is no linear relationship between X and Y

    b. X increases as Y decreases

    c. there is a cause and effect relationship between X and Y

    d. Jack has definitely made a mistake in the calculation

    e. X decreases as Y decreases

3. A study was conducted to examine the quality of fish after seven days in ice storage. For this study: Y = measurement of fish quality (on a 10 point scale) and X= number of hours after being caught that the fish were packed in ice. The sample linear regression equation is $\hat{Y} = 8.5 - 0.5X$. From this we can say that:

    a. A one hour delay in packing the fish in ice decreases the estimated quality by 0.5.

    b. A one hour delay in packing the fish in ice increases the estimated quality by 0.5.

    c. If the estimated quality increases by 1 then the fish have been packed in ice one hour sooner.

    d. If the estimated quality increases by 1 the fish have been packed in ice two hours later.

    e. Cannot really say until we see a plot of the data

4. A study found a correlation of $r = -0.61$ between the sex of a worker and his or her income. You conclude that:

    a. women earn more than men on average

    b. women earn less than men on average

    c. an arithmetic mistake was made; this is not a possible value of r

    d. this is nonsense because r makes no sense here

    e. the correlation of -0.61 is not meaningful here because the relationship between sex and income is likely nonliear

5. If the correlation between body weight and annual income were high and positive, we could conclude that

a. high incomes cause people to eat more food

b. lower income cause people to eat less food

c. high income people tend to spend a greater proportion of their income on food than low income people, on average

d. high income people tend to be heavier than low income people, on average

e. high incomes cause people to gain weight

6. A study found a correlation of $r = -0.72$ between family income in dollars and the number of pounds of soft margarine the family consumes in a year. You conclude that:

a. this is nonsense - you can't compute a correlation between income and amount of margarine

b. something is wrong - a correlation cannot take the value -0.72

c. higher income families tend to consume less soft margarine than do lower income families

d. higher incomes cause families to consume more soft margarine

e. higher income families tend to consume more soft margarine than do lower income families

7. Situations in which linear regression can be used are:

a. we wish to use this year's price of stock A to predict its price in two years

b. we are interested in a variable which is difficult to measure and want to predict it using a variable that is easy to measure

c. wish to compare the standard method of treating a disease with a new method

d. both (a) and (b)

e. none of these

8. A study is conducted to determine if one can predict the yield of a crop based on the amount of year rainfall. What is the explanatory variable ?

a. amount of yearly rainfall

b. yield of the crop

c. the experimenter

d. either centimeters or inches of water

e. none of the above

9. The least square regression line is the straight line $\hat{y} = \hat{\beta}_0 + \hat{\beta}_1 x$ that

a. minimizes the sum of the squares of observed x-values

b. minimizes the sum of the squares of observed y-values

c. minimizes the sum of the squares of the distances of the observed y-values from the line

d. maximizes the sum of the squares of the distances of the observed y-values from the line

e. none of these

Solutions

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1. (d) , 2. (b) , 3. (a) , 4. (d) , 5. (d) , 6. (c) , 7. (d) , 8. (a), 9. (c)