

## Information

For each of Questions 1 to 5, is the given value of the correlation coefficient reasonable?

Hint: think about the strength and the direction of the relationship between the two variables in each case.

### Question 1 (1 point)

A correlation of  $r = 0.75$  between a person's eye colour and hair colour.

Question 1 options:

- A) Reasonable
- B) Not reasonable

### Question 2 (1 point)

A correlation of  $r = 0.75$  between age of a university student and time until graduation.

Question 2 options:

- A) Reasonable
- B) Not reasonable

### Question 3 (1 point)

A correlation of  $r = -1$  between minutes watched of a movie and minutes remaining.

Question 3 options:

- A) Reasonable
- B) Not reasonable

### Question 4 (1 point)

A correlation of  $r = 0.75$  between age of a vehicle and number of miles driven on the vehicle.

Question 4 options:

- A) Reasonable
- B) Not reasonable

**Question 5 (1 point)**

A correlation of  $r = -1$  between number of classes missed and exam score.

Question 5 options:

- A) Reasonable
- B) Not reasonable

**Question 6 (1 point)**

A random sample of adults is selected and their height  $X$  (in cm) and their weight  $Y$  (in kg) are measured. The correlation between height and weight is calculated to be  $r = 0.54$ . What would be the value of the correlation if height had instead been measured in inches (1 cm = 0.39 inches) and weight had instead been measured in pounds (1 kg = 2.2 pounds)?

Question 6 options:

- A) 0.54
- B) 0.48
- C) 0.71
- D) 0.62
- E) 0.58

**Question 7 (1 point)**

A student believes that the number of presents underneath a Christmas tree can be predicted by the height of the Christmas tree (in feet). A random sample of households was selected and the least squares regression line was calculated to be  $\hat{y} = 4.5 + 1.3x$ . It was also calculated that the mean and standard deviation for the number of presents were 5.8 and 3.2, respectively, and the mean and standard deviation for the height of Christmas trees were 6.3 feet and 1.2 feet, respectively. What is the value of the correlation between the number of presents and the height of a tree?

Question 7 options:

- A) 0.08
- B) 0.37
- C) 0.49
- D) 0.24
- E) 0.30

## Information

Questions 8 to 11 refer to the following:

Maria would like to determine how the amount of melatonin taken can help predict the amount of time it takes her to fall asleep. The following is a table of her results:

Melatonin dose (in mg)	1	1	3	3	5	5	10	10
Minutes to fall asleep	20	17	18	14	15	12	10	9

The least squares regression line is calculated to be

$$\hat{y} = 19.059 - 0.986x$$

and it is reported that 82.19% of the variation in time to fall asleep is explained by its regression on melatonin dose.

### Question 8 (1 point)

Identify the explanatory variable and the response variable.

Explanatory variable is

- A) Melatonin dose
- B) Minutes to fall asleep

Response variable is

- A) Melatonin dose
- B) Minutes to fall asleep

**Question 9 (1 point)**

What is the correlation between melatonin dose and time to fall asleep?

HINT: Do not use the correlation formula to answer this question. There is a much faster way.

Enter only a numerical answer (**do not** show any work). Round your answer to 2 decimal places.

Your Answer:

**Question 10 (1 point)**

What is the residual for the day Maria took a 5 mg dose of melatonin and fell asleep in 15 minutes?

Question 10 options:

- A) -8.989
- B) -4.93
- C) 0.731
- D) 0.871
- E) 4.93

**Question 11 (1 point)**

What is the correct interpretation for the slope?

Question 11 options:

- A) For every increase in 1 mg of melatonin, we predict it will take 19.059 more minutes to fall asleep.
- B) For every increase in 1 mg of melatonin, we predict it will take 0.986 minutes less to fall asleep.
- C) For every 0.986 minutes less it takes to fall asleep, we predict that amount of melatonin taken will increase by 1.
- D) For every 1 minute increase in the time it takes to fall asleep, we predict that amount of melatonin taken will decrease by 0.986 mg.
- E) We predict that if she took no melatonin that she would fall asleep in 19.059 minutes.

**Question 12 (1 point)**

Which of the following statements about the slope of the least squares regression line is true?

Question 12 options:

- A) It lies between -1 and 1, inclusive.
- B) The larger the value of the slope, the stronger the linear relationship between the variables.
- C) It always has the same sign as the correlation.
- D) The square of the slope is equal to the fraction of of variation in Y that is explained by its regression on X.
- E) All of the above are true.