

# Results

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12

Out of 12 points

03:23

Time for this attempt

## Your Answers:

1 1 / 1 point

Which of the following is true about using the scatterplot? (select all that apply)

- ☐ The coordinate of a point on the vertical axis is determined by the explanatory variable
- ☒ Each individual is represented by a point on the plot
- ☒ The coordinate of a point on the vertical axis is determined by the response variable
- ☐ The response variable should be plotted on the horizontal axis

2 1 / 1 point

The correlation coefficient between the height (inch) and weight (lbs) is 0.8. Suppose the unit of height inch is converted to meter, and the unit of weight is converted to kg, how will this affect the correlation coefficient?

- ☐ The sign will change
- ☐ The magnitude will change
- ☐ Both the sign and the magnitude will change
- ☒ Neither the sign nor magnitude will change

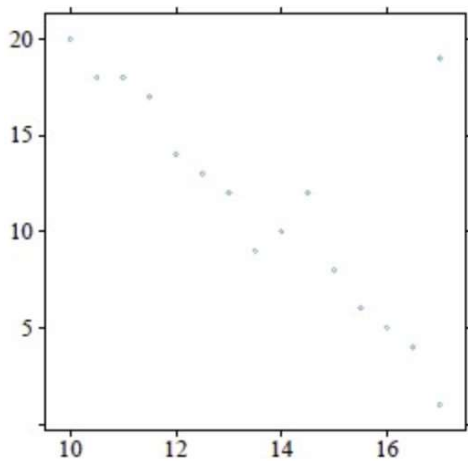
3 1 / 1 point

Which of the following statements is correct

- ☐ The correlation coefficient is not affected by the outliers
- ☐ The sign of the correlation coefficient is either positive or negative
- ☒ The correlation coefficient itself does not tell us whether the relationship is linear or not
- ☐ Correlation coefficient has the same units as the explanatory variable

4 1 / 1 point

If the point in the upper right corner were removed from the scatterplot, what will happen to the value of the correlation coefficient  $r$ ?



✓ ☒ r will become closer to -1

- ☐ r will become closer to 0
- ☐ r will not change
- ☐ r will become closer to 1

5 1 / 1 point

A study about high school student SAT scores reported that a student's SAT Math score has a strong positive linear association with his/her SAT Verbal score. What can you determine about the relationship between SAT Math scores and SAT Verbal scores?

- ☐ If student A has a lower SAT Math score than student B, then A will also have lower SAT Verbal score than B.
- ☐ The points on scatterplot of the two variables all lie on a straight line

✓ ☒ Students with higher SAT Math scores tend to have higher SAT Verbal scores.

- ☐ Students who like Math also like Verbal.

6 1 / 1 point

Which of the following statements is correct about the confounding variable? (select all that apply)

☐ A confounding variable is an extra variable that is measured in the study but is not expected to have an effect on the response variable.

✓ ☒ A confounding variable is a third variable that is not measured in a study but may have an effect on the relationship between the variables being studied.

☐ A confounding variable is manipulated by the researcher to test its effect on the response variable.

☐ Confounding variables are usually not a significant issue as they can be easily controlled for in a study.

✓ ☒ Confounding variable can lead to spurious or misleading results that do not accurately reflect the true relationship between the variables of interest.

7 1 / 1 point

Consider the following statement: "a study found that people who consume more alcohol are more likely to die at an early age"

Which of the following is a possible confounding variable in this study?

- ☐ Smoking
- ☐ Gender
- ☐ Socioeconomic status
- ☐ None of these

✓ ☒ All of these

8 1 / 1 point

A random sample of 100 cars was taken and data were recorded on the miles per gallon (mpg) in the city and on the highway. The mean **city mpg** was 28 with a standard deviation of 9. The mean **highway mpg** was 35 with a standard deviation of 8.5. The correlation coefficient between city mpg and highway mpg is 0.9.

Determine the slope for the linear model that **predicts highway mpg** from **city mpg** and interpret it in context.

- ☐ The slope is 0.95. For every one mpg increase in **highway mpg**, the **city mpg** is expected to **increase** by 0.95.
- ☐ The slope is 0.9. For every one mpg increase in **highway mpg**, the **city mpg** is expected to **increase** by 0.9.
- ☒ The slope is 0.85. For every one mpg increase in **city mpg**, the **highway mpg** is expected to **increase** by 0.85.
- ☐ The slope is 0.81. For every one mpg increase in **city mpg**, the **highway mpg** is expected to **increase** by 0.81.

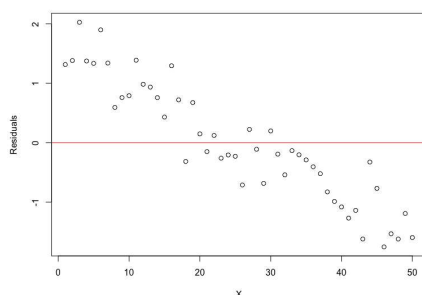
9 1 / 1 point

Two variables X and Y has a correlation coefficient of 0.9. Which of the following statements is correct if we fit a linear model to Y using X as the explanatory variable?

- ☐ 95% of the variation in Y can be explained by X.
- ☐ 90% of the variation in Y can be explained by X.
- ☐ 30% of the variation in Y can be explained by X.
- ☒ 81% of the variation in Y can be explained by X.

10 1 / 1 point

Below is a **residual plot** for fitting a linear regression model:



What does the residual plot suggest about the model? (select all that apply)

- ☐ The variables have a strong negative linear relationship
- ☒ The linear regression model is not a good fit for the data
- ☒ The variables are not linearly associated
- ☐ The linear regression model is a good fit for the data

11 1 / 1 point

Which of the following statements is correct about residuals?

- ☒ A negative residual means that the predicted y-value ( $\hat{y}$ ) is larger than the observation y-value ( $y$ )
- ☐ The smaller the residuals, the better the fit of the regression model
- ☐ Positive residuals indicate that the regression model is a bad fit
- ☐ We find the regression line of best fit using the sum of the residuals

12 1 / 1 point

Data were recorded for 117 months on a household's gas bill (in dollars) and the average monthly temperatures for its neighborhood. The correlation coefficient between monthly temperature and gas bill price is  $-0.92$ . The summary statistics is in the table below.

	Average monthly temperature (°F)	Gas bill (\$)
Mean	48	81
Standard Deviation	20	65

Determine which is correct about the linear model that predicts gas bill price from monthly temperature.

- ☐ The intercept is 94.44, the predicted gas bill is \$94.44 if the average monthly temperature is 0 degrees.
- ☐ The slope is -0.28, the predicted gas bill decreases on average by \$0.28 if the average monthly temperature increases by 1 degree.

☐ 92% of the variation in gas bills can be explained by the average monthly temperature.



☒ The slope is -2.99, the predicted gas bill decreases on average by \$2.99 if the average monthly temperature increases by 1 degree.