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Answer Explanation

Correct answer:

The estimate, a predicted test score of 80.56, is both reliable and reasonable.

The data in the table only includes exercise times between 25 and 40 minutes, so the line of best fit gives reasonable predictions for values of x between 25 and 40. Since 38 is between these values, the estimate is both reliable and reasonable.

Question

Data is collected on the relationship between the average daily temperature and time spent watching television. The data is shown in the table and the line of best fit for the data is $\hat{y}=-0.81x+96.7$. Assume the line of best fit is significant and there is a strong linear relationship between the variables.

Temperature (Degrees)	30	40	50	60
Minutes Watching Television	73	63	57	48

(a) According to the line of best fit, what would be the predicted number of minutes spent watching television for an average daily temperature of 45 degrees? Round your answer to two decimal places.

Answer 1:

That's not right - let's review the answer.

The predicted number of minutes spent watching television is $$133.15$.

Answer 2:

Keep trying - mistakes can help us grow.

The predicted number of minutes spent watching television is $$133.15.

Answer Explanation

The predicted number of minutes spent watching television is 1$$.

Correct answers:

- 1$60.25$60.25

Substitute 45 for x into the line of best fit to estimate the number of minutes spent watching television for an average daily temperature of 45 degrees: $\hat{y}=-0.81(45)+96.7=60.25$.

Question

Data is collected on the relationship between the average daily temperature and time spent watching television. The data is shown in the table and the line of best fit for the data is $\hat{y}=-0.81x+96.7$.

Temperature (Degrees) 30405060 Minutes Watching Television 73635748

(a) According to the line of best fit, the predicted number of minutes spent watching television for an average daily temperature of 45 *degrees is* 60.25.

(b) Is it reasonable to use this line of best fit to make the above prediction?

Correct! You nailed it.

The estimate, a predicted time of 60.25 minutes, is unreliable but reasonable.

The data in the table only includes temperatures between 40 and 70 degrees, so the line of best fit gives reliable and reasonable predictions for values of x between 40 and 70. Since 39 is not between these values, the estimate is not reliable. However, 71.1 minutes is a reasonable time.

Your answer:

The estimate, a predicted time of 71.1 minutes, is both reliable and reasonable.

This estimate is not reliable, because 39 is outside of the range 40 to 70 given in the table.

Question

Daniel owns a business consulting service. For each consultation, he charges $\$95$ plus $\$70$ per hour of work. A linear equation that expresses the total amount of money Daniel earns per consultation is $y=70x+95$. What are the independent and dependent variables? What is the y-intercept and the slope?

Keep trying - mistakes can help us grow.

The independent variable (x) is the amount, in dollars, Daniel earns for a consultation. The dependent variable (y) is the amount of time Daniel consults.

Daniel charges a one-time fee of $\$95$ (this is when $x=0$), so the y-intercept is 95. Daniel earns $\$70$ for each hour he works, so the slope is 70.

The independent variable (x) is the amount of time Daniel consults. The dependent variable (y) is the amount, in dollars, Daniel earns for a consultation.

Daniel charges a one-time fee of $\$95$ (this is when $x=0$), so the y-intercept is 95. Daniel earns $\$70$ for each hour he works, so the slope is 70.

The independent variable (x) is the amount, in dollars, Daniel earns for a consultation. The dependent variable (y) is the amount of time Daniel consults.

Daniel charges a one-time fee of $\$70$ (this is when $x=0$), so the y-intercept is 70. Daniel earns $\$95$ for each hour he works, so the slope is 95.

If you use a TI-83 or TI-84 calculator, you press STAT, and then ENTER, which brings you to the edit menu where you can enter values. In the L1 list, you enter the values of x from the table above, $0,1,2,3,4,5$. Then, in the L2 list, you enter the values of y from the table above, $2.83,3.33,6.99,8.01,7.62,7.66$.

Now, press STAT again, and arrow to the right, to CALC. Arrow down to the LinReg option and press ENTER. The resulting a and b are the slope m and y-intercept b of the linear regression line. You should find that $m \approx 1.09$ and $b \approx 3.36$. So the final answer is

$$y = 1.09x + 3.36$$

Using spreadsheet software or other statistical software should give you the same result.

Question

A least squares regression line (best-fit line) has the equation, $\hat{y} = 2.87x - 43.5$. What is the **slope** of this linear regression equation?

Great work! That's correct.

The **slope** of the line is 2.87, which tells us that the dependent variable (y) decreases 2.87 for every one unit increase in the independent (x) variable, on average.

The **slope** of the line is 2.87, which tells us that the dependent variable (y) increases 2.87 for every one unit increase in the independent (x) variable, on average.

The **slope** of the line is -43.5, which tells us that the dependent variable (y) increases 43.5 for every one unit increase in the independent (x) variable, on average.

The **slope** of the line is -43.5, which tells us that the dependent variable (y) decreases 43.5 for every one unit increase in the independent (x) variable, on average.

Answer Explanation

Micrograms of asbestos inhaled	Area of scar tissue (cm^2)
63	188
67	215
70	184

Using technology, it was determined that the total sum of squares (SST) was 1421.2 and the sum of squares due to error (SSE) was 903.51. Calculate $R2$ and determine its meaning. Round your answer to four decimal places.

Correct! You nailed it.

$R2=0.3643$

Therefore, 36.43% of the variation in the observed y-values can be explained by the estimated regression equation.

$R2=0.3643$

Therefore, 0.3643% of the variation in the observed y-values can be explained by the estimated regression equation.

$R2=0.6357$

Therefore, 63.57% of the variation in the observed y-values can be explained by the estimated regression equation.

$R2=0.6357$

Therefore, 0.6357% of the variation in observed y-values can be explained by the estimated regression equation.

Answer Explanation

Correct answer:

$R2=0.3643$

Therefore, 36.43% of the variation in the observed y-values can be explained by the estimated regression equation.

$$R2=1-\frac{SSE}{SST}$$

$$R^2=1-903.511421.2$$

$$R^2=1-0.6357$$

$$R^2=0.3643$$

$$R^2=36.43\%$$

A scientific study on speed limits gives the following data table.

Average speed limit	Average annual fatalities
25	16
27	29
29	38
32	71
35	93

Using technology, it was determined that the total sum of squares (SST) was 4029.2, the sum of squares regression (SSR) was 3968.4, and the sum of squares due to error (SSE) was 60.835. Calculate R^2 and determine its meaning. Round your answer to four decimal places.

Perfect. Your hard work is paying off 😀

$R^2=0.0153$
Therefore, 1.53% of the variation in the observed y-values can be explained by the estimated regression equation.

$R^2=0.9849$

Identify what can be concluded based on this information.

Great work! That's correct.

There is evidence that caffeine causes lower (better) reaction times.

People with lower (better) reaction times generally choose to consume more caffeine.

Lower reaction times are associated with higher caffeine doses, but this study provides no evidence that caffeine causes lower reaction times.

There is no relationship between reaction time and caffeine.

Answer Explanation

Correct answer:

There is evidence that caffeine causes lower (better) reaction times.

Correlation alone does not prove causation, but this scenario provides more evidence than just correlation between two variables. Since the data were obtained from an appropriately randomized controlled experiment, a correlation can be used as evidence of a causal relationship. Since all other variables were controlled, there is no third variable that could be associated with caffeine that actually causes differences in reaction times.

Question

A non-profit finds that donations decrease when the economy measured by GDP decreases.

Identify the relation between donations and GDP.

Great work! That's correct.

Donations and GDP are positively correlated.

6, 75, 34

Yes that's right. Keep it up!

The percent of on-call service representatives is the x-coordinate, while the percent of purchases over $\$75$ is the y-coordinate. So, the table of values corresponds to the points

$$(20,20), (35,25), (50,40), (55,35), (60,40), (75,54).$$

ON THIS QUESTION, IT'S ASKING YOU TO GRAPH THE %OF ONCALL SRVC WITH %OF PURCHASE

Using the linear relationship graphed above, estimate the percent of over $\$75$ purchases if there are 40% on-call service representatives.

Answer 1:

Not quite - review the answer explanation to help get the next one.

$$60%

Answer 2:

That's not right - let's review the answer.

$$67.5%

Answer Explanation

Correct answers:

- 30%

Based on the linear relationship that is graphed, when the percent of on-call service representatives is 40%, the line has a value between 25 and 35.

A government agency explored the relationship between the percent of companies that are technology related and the percent of higher paying jobs. The researchers collects information from 5 states, shown in the table below.

A random sample of 11 employees produced the following data where x is the number of shifts worked in 8 weeks, and y is the number of breaks taken.

X = explanatory variable Y = outcome of the study # of breaks taken per shifts worked

x	y
27	15
29	19
30	19
32	17
33	20
35	22
36	20
37	23
39	22
21	24
43	20

What is the equation of the regression line?

y = 0.381z + 6.9

Question:

A random sample of 11 university students produced the following data where x is the minutes spent studying per day, and y is the first exam score (out a maximum of 100 points).

x	y
11	39
13	55
14	43
17	46
19	69
22	75