

The number of kilograms of steam used per month by a chemical plant is thought to be related to the average ambient temperature for that month. Given the following past data.

| x:<br>Temperature | y:<br>Usage | x:<br>Temperature | y:<br>Usage |
|-------------------|-------------|-------------------|-------------|
| -6                | 85          | 20                | 282         |
| -4                | 97          | 23                | 306         |
| 0                 | 131         | 17                | 254         |
| 8                 | 192         | 10                | 205         |
| 10                | 206         |                   |             |
| 15                | 245         |                   |             |

Calculate  $S_{xy}$ . Show calculations



Given the following results for a simple linear regression:

| predictor | Coef  | SE Coef | T |
|-----------|-------|---------|---|
| Constant  | 26.75 | 2.73    | ? |
| x         | 1.48  | 0.11    |   |

| Source     | DF | SS   | MSE | F |
|------------|----|------|-----|---|
| Regression | ?  | ?    | ?   | ? |
| Residual   | ?  | 95   | ?   |   |
| Total      | 15 | 1500 |     |   |

Calculate: Show calculations

- (1) Error standard deviation
- (2) Test whether the intercept is greater than 25. Provide t values and state your conclusions.
- (3) Test for significance of the regression. Provide F values and state your conclusions.



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- (1) Fit the simple linear model using the method of least squares.
- (2) What is the estimate of the expected steam usage when the average temperature is 10
- (3) What change in means steam usage is expected when the monthly average temperature changes by 2?
- (4) Calculate the residual when  $x=8$ .



A simple regression model was used to fit the relationship between independent "X" and dependent "y" variables. It was found that:

Show calculations

$$y = 48.01 + B_1x - 59.06$$

$$S_{xy} =$$

$$SST = 159.722.12$$

$$SSE =$$

$$n = 14$$

- (1) Calculate  $S_{xx}$
- (2) Estimated regression coefficient  $B_1$
- (3) Error variance
- (4)  $Se(B^1)$

The number of kilograms of steam used per month by a chemical plant is thought to be related to the average ambient temperature for that month.

Given the following ( $n=11$ ):

Show calculations

$$y = 129.662 + 7.5955x$$

$$s = 2.19595$$

$$R^2 = 90.50\%$$

$$R^2_{\text{adj}} = 90.0\%$$

(1) Calculate the sum of squares for regression.

(2) Calculate  $S_{xy}$

(3) Calculate the 95% CI on the slope.



Determine whether or not the following models are intrinsically linear. If yes, formulate the appropriate transformation to generate the linear model. Show answer details

$$y = X / (B_0 X + B_1 + X e)$$