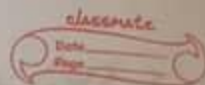


Homework-22



Given,

$$n = 13$$

$$\text{sum of } x = 303.7$$

$$\text{sum of } y = 52.8$$

$$S_{xx} = 1585.230769$$

$$S_{xy} = -341.959231$$

$$S_{yy} = 77.230769$$

Ans

Regression Equation at
 $x = 25$

$$\hat{y} = 9.101 - 0.216x$$

or, $x = 25$

$$\begin{aligned} \hat{y} &= 9.101 - 0.216(25) \\ &= 3.708 \text{ mg/l} \end{aligned}$$

Ans

The slope is -0.216 , which means, for each 1ml/h increase in transpiration, the ammonium concentration decreases by 0.216 mg/l.

Ans

When $x = 45$ you are going beyond the observed data range (which goes from ~ 5.8 to 40.4).

It does not make sense to calculate this point estimate because we cannot be confident the linear relationship holds outside the original range.

Ans Estimate of σ
 Standard Error of the Regression
 $\hat{\sigma} \approx 0.564$

Ans
 95% Confidence Interval for true slope
 $CI = (-0.247, -0.185)$

This means we are 95% confident that the true decrease in ammonium concentration with increase in transpiration lies between 0.185 and 0.247 g/L

Ans

H_0	H_1	H_2
$\beta_1 = 0$		$\beta_1 \neq 0$
(no relation)		(relation)

t-statistics = -15.216
 p-value : 9.80×10^{-9}

Since, p-value < 0.05 , we reject

H_0 .
 This is a statistically significant linear relationship between transpiration and ammonium concentration.

Ans
 $R^2 = 0.955$, which means about 95.5% of the variability in ammonium concentration is explained by linear relationship