12.1 WS

Solutions

(A) \( \hat{y} = 560.65 - 3.0771x \)
\( \hat{y} \) = predicted calories
\( x \) = time at the table

(B) Slope = -3.0771
For each additional minute spent at the table, the amount of calories consumed decreases by 3.0771

\( y \)-intercept = 560.65
Extrapolation because the smallest value measured is 20 minutes. Additionally, the \( y \)-intercept means at zero minutes at the table a child consumes 560.65 calories. This makes no practical sense.

(C) \( H_0: B = 0 \)
\( H_A: B < 0 \)
\( B \) = true slope of the population regression line relating time at the table to calorie consumption. \( \alpha = 0.01 \)
Linear: The given scatterplot is roughly linear.

Independent: There were 20 toddlers observed, which is clearly less than 10% of all toddlers.

Normal: The histogram is mound shaped and approximately symmetric so the residuals could follow a Normal distribution.

Equal Variance: The residual plot shows a roughly equal distribution of positive & negative residuals, as evidenced by the residual plot.

Random: The data is from a random sample.

T Test for Linear Regression

\[ T = 3.62 \]
\[ df = 18 \]
\[ p = 0.001 \] (divide given p-value by 2, since one sided T-Test)

Since the p-value is less than \( \alpha = 0.01 \) we reject the null hypothesis. We have convincing evidence that there is a negative relationship between time at the table and caloric consumption.