

Instructions: Answer each question as thoroughly as possible. Round answers to 4 decimal places as needed. Exact answers are best when possible. Be sure to answer all parts of each question.

1. Consider the data below where x_1 is furnace temperature and x_2 is die close time, and y is temperature difference on the die cast.

x_1	1332	1393	1399	1259	1340	1314	1335	1431	1423
x_2	6.16	8.86	9.11	8.50	8.94	14.27	11.61	8.88	10.64
y	85.74	102.54	106.84	86.06	95.02	91.54	100.67	108.70	109.78

- a. Enter the data in R and find the correlation between pairs of three variables.
 $X_1, X_2 \rightarrow 0.0702$ $X_1, Y \rightarrow 0.9057$ $X_2, Y \rightarrow 0.1699$
- b. Create a multiple regression model of y using the two independent variables. Describe your model test and test of each coefficient. $H_0: \beta_1 = 0, H_a: \beta_1 \neq 0$ $p\text{-value} = 0.0007$ *reject null*
 $H_0: \beta_2 = 0, H_a: \beta_2 \neq 0$ $p\text{-value} = 0.1559$ *fail to reject null*
- c. Write the equation of your final, best-fit model.
 $Y = 0.14940 X_1 - 104.411$
- d. What proportion of the variability in y can be explained by the model?
 82.03%
- e. Create a 90% confidence interval for β_2 .
 β_2 was kicked out of the model CI includes 0
- f. Create residual plots against both independent variables to test model assumptions.
- g. Predict y when x_1 is 1305 and x_2 is 8.1. Construct a 95% prediction interval around your mean prediction.
 Center 90.55568 (80.53204, 100.5793)

Include all graphs and model output to support your answers.



