Stat 21 Test 1 v 1 Corrections

1) correct options are A and C.

5) The correct options are C and D.

6)

Step 1.

I would plot a scatter plot with y-axis being APR at time of payment and x-axis being payments made on credit card (cc). APR is response variable and payments are predictor variable because cc companies determine APR using factors like timely payment. If the relationship between the 2 variables looks linear, I will choose to use a simple linear regression model.

Step 2.

Using R, I would fit a SLR and determine the y-intercept and slope to construct Y = beta_0 + beta_1 * X.

Step 3.

I would use residual plot (residuals vs fitted values) and normal quantile plot to determine whether assumptions of linearity, constant variance, and normality are met. Additionally, I would consider whether assumptions zero mean, independence, and randomness are met as well.

Step 4.

I would conduct a 95% CI to find mean response (APR) for particular value of payments made.

8B) No, none of the plots' behavior would change. The unit conversion would not change the actual size of the diamonds nor the cost; only the scale of the size has changed. The regression model would look the same though the

(size)

β_1 value is different due to the x-values changing. The actual and predicted y-values did not change so the residuals aren't affected. The residual plot and normal quantile plot are not affected. Furthermore, the studentized residuals are unit-less, so the histogram of studentized residuals is unaffected by unit conversion.

9A). The standard deviation of the number of calories burned is 30.84 calories.

9D). Multiple R^2 : 0.4313

R^2 tells us the percentage of total variability that can be explained by model. $R^2 = 1$ means model explains all variability, and therefore, a better fit model has R^2 closer to 1.

P-value for t-test of β_1 : 0.00225

The t-test $H_0: \beta_1 = 0$ $H_A: \beta_1 \neq 0$. If the p-value is less than the alpha value, then we reject the null hypothesis in favor of the alternative hypothesis. We have statistically convincing evidence that $\beta_1 \neq 0$; the fit of the model is better than by random chance.