Solutions to Chapter 10 Problems

1. (a) We should use temperature as the explanatory variable so that we can use it to predict the drying time.

   (b) Intercept: 8.3 means that if the temperature is 0^oF we expect the drying time to be 8.3 hours.

   Slope: -0.09 means that if the temperature increases by 1^oF we expect the drying time to decrease by 0.09 hours (or 5.4 minutes)

2. (a) The scatter plot shows a linear association that is strong and positive.

   (b) Robbery rate was used as the explanatory (as identified in the slope line of R output), therefore homicide rate is the response variable.

   (c) Since `Multiple R-squared:  0.9237` the correlation is $R = \pm\sqrt{0.9237} = +0.961$. This means that the linear relationship we observed in the scatterplot is indeed strong.

   (d) Regression Line: $\hat{y} = 0.026x - 0.925$

   The intercept suggests that for a city with a robbery rate 0 we would expect to have a homicide rate of about -0.9.

   The slope suggests that if the robbery rate by 1 per 100,000, we expect the homicide rate to increase by about 0.03.

   (e) Increase by 0.03

   (f) `Multiple R-squared:  0.9237`

   (g) $\hat{y} = 0.026(141) - 0.925 = 2.74$

   This robbery rate was observed in city 3, which had an actual homicide rate of 3.4.

   The residual is $e = y - \hat{y} = 3.4 - 2.74 = 0.7$

   (h) The residual plot has no obvious pattern, suggesting no fundamental problems with our model assumptions.