NOTE: These questions are representative of what will be on the exam.

Questions 1-7. Forty-six mountains in the Adirondacks of upstate New York are known as the High Peaks with elevations near or above 4000 feet. Below is some R output from a linear regression model of $Y = Time$ (expected trip time to hike the peak, in hours) on $X = Ascent$ (in feet).

```
> summary(time.lm)
Call:
lm(formula = Time ~ Ascent, data = HighPeaks)

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept) 4.2100541  1.8661683   2.256  0.02909 *
Ascent      0.0020805  0.0005909   3.521  0.00101 **

Residual standard error: 2.496 on 44 degrees of freedom
Multiple R-squared: 0.2198,     Adjusted R-squared: 0.2021
F-statistic: 12.4 on 1 and 44 DF, p-value: 0.001014
```

1. Interpret the slope with appropriate units.

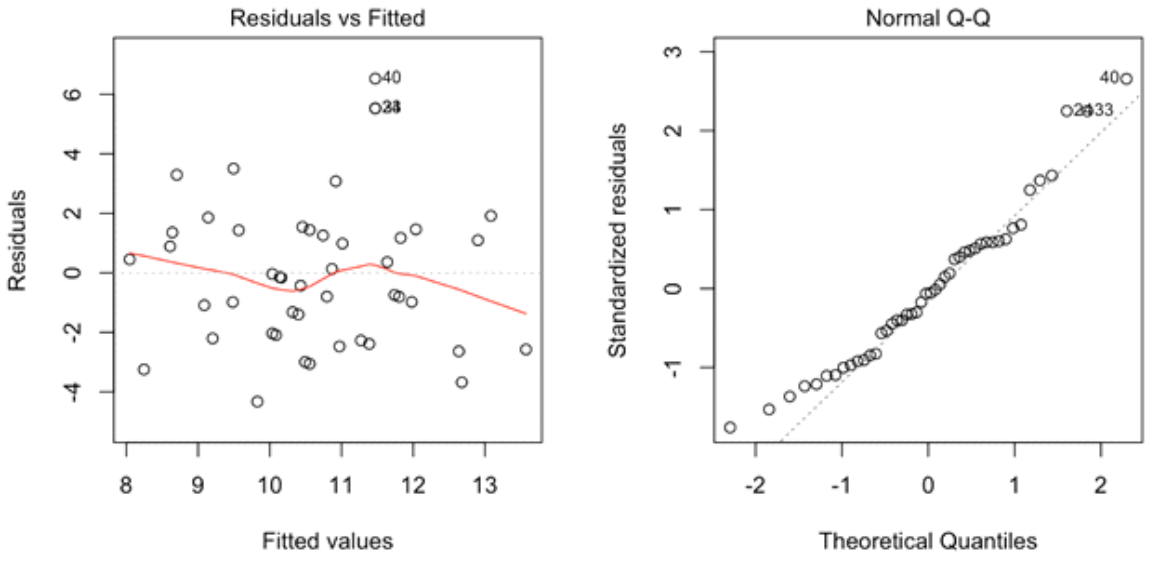
2. The 95% confidence interval for β_1, the coefficient of *Ascent*, is (0.00089, 0.00327). Interpret this interval using an increment of 1000 feet of Ascent.

3. Interpret the residual standard error.

4. Interpret the coefficient of determination.

5. Using this model, predict the hiking time for a mountain with an ascent of 4000 feet.

6. Interpret the residual plots from this fit:

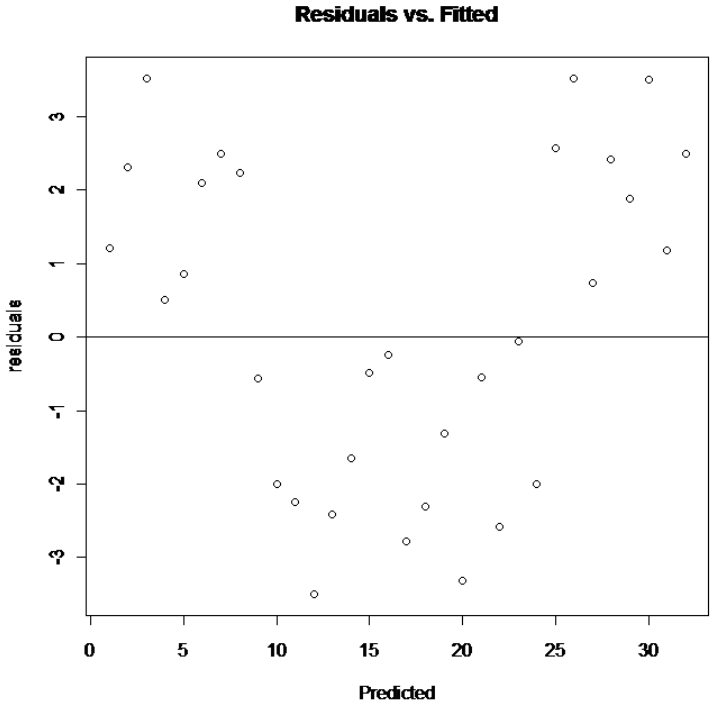


7. Using the R output below, report and interpret a 95% confidence interval for the mean trip time when *Ascent* is 3000 feet.

```
> predict.lm(time.lm, list(Ascent=3000),interval="confidence")
       fit      lwr      upr
1 10.45163 9.701043 11.20222
> predict.lm(time.lm, list(Ascent=3000),interval="prediction")
       fit      lwr      upr
1 10.45163 5.365099 15.53816
```

Note: this is the end of the questions based on the Adirondack data.

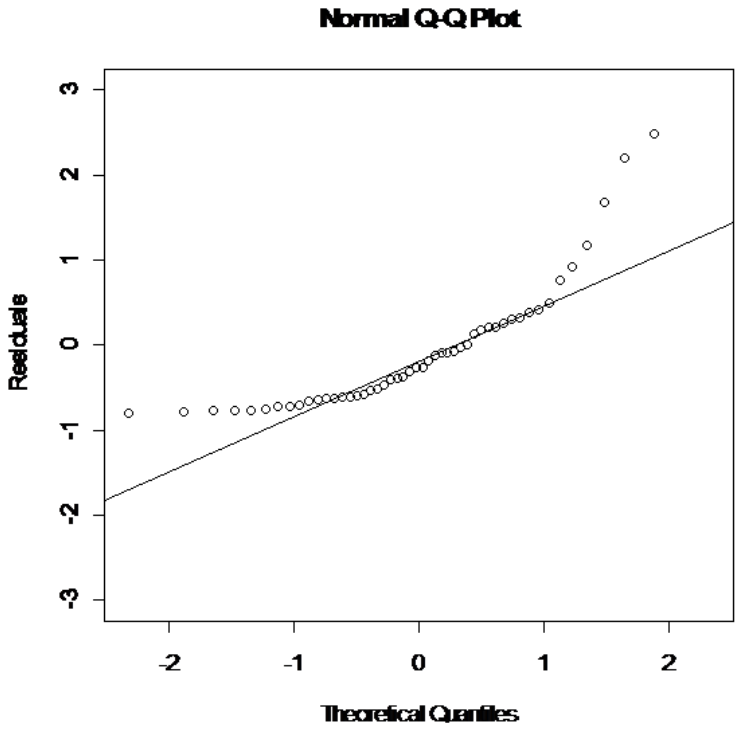
8. A residuals vs. fitted value plot for a regression model is shown below. Based only on the information in this plot, do you feel the condition of linearity is *reasonable*, *problematic*, or you *can't judge* (from the plot shown)?



9. Using the same plot (above), do you feel the condition of equal variance is *reasonable*, *problematic*, or you *can't judge*?

10. Using the same plot (above), do you feel the condition of normality is *reasonable*, *problematic*, or you *can't judge*?

11. A normal quantile plot for a regression model is shown below. Based only on the information in this plot, do you feel the condition of linearity is *reasonable*, *problematic*, or you *can't judge*?



12. Using the same plot (above), do you feel the condition of normality is *reasonable*, *problematic*, or you *can't judge*?

Other topics to review:

1. Outliers, leverage, and influential points
2. ANOVA table calculations