1. Is the claim that average towing charges exceed $400 a null hypothesis or an alternate hypothesis?

2. The null hypothesis is that the mean height of my population is no greater than 160 cm. State the alternate hypothesis.

3. My null hypothesis is that the average number of hours of sleep per night is greater than or equal to 6 hours.
   After a brief statistical study, I reject the null hypothesis.
   Later I find out that the null hypothesis was actually correct.
   When I rejected the null hypothesis, did I make a type I or type II error?

4. The level of significance $\alpha$ has to do with type I errors. Explain what $\alpha$ measures.

5. True or False: The lower the $P$-value of a hypothesis test, the more likely it is that the null hypothesis is false.

6. True or False: If the $P$-value of a hypothesis test exceeds the level of significance $\alpha$, then we will cheerfully reject the null hypothesis.

7. The claim is made that the average working life of a brand of microwaves exceeds 4.3 years. I’ve just taken an average of 35 of these machines and found the mean to be 4.4 years. Assuming the means are normally distributed, I calculated the $z$-value of 4.4 to be $z = 2.1$.

   (a) state the null and alternative hypotheses
   (b) calculate the $P$-value of this hypothesis test using our test statistic.
   (c) sketch the rejection region corresponding to level of significance $\alpha = 0.05$.

8. I’ve just computed the Pearson correlation coefficient $r = 0.65$ for a collection of $n = 12$ sample data points. How confident should I be that my original (larger) population of data has a linear correlation? (use table 11)

9. From 500 responses of people randomly selected throughout Seattle, a total of 30 admitted to unconscious intervals while driving at high speeds on highways through busy areas. Construct a confidence interval for the percentage of unconscious drivers in Seattle based on this contrived data.

10. Internet usage in a randomly selected group of 400 people is studied: the mean number of hours on-line each day was found to be $\bar{x} = 3.5$ hours, with a standard deviation of $s = 2$ hours. Construct a 90% confidence interval for the mean number of hours on-line each day.

11. The null hypothesis is that the mean height of my population is no greater than 160 cm. The mean height of a sample of 100 randomly chosen people is 161 cm., with a standard deviation of 5 cm. Can I reject the null hypothesis at level of significance $\alpha = 0.05$?
12. A claim is made that the mean IQ scores of two populations are different. 
A sample of 35 people from the first population is chosen to be independent of a sample of 
35 people from the second population. 
From the first sample, the mean IQ was $\bar{x}_1 = 102$ with a standard deviation of $s_1 = 5$. 
From the first sample, the mean IQ was $\bar{x}_2 = 105$ with a standard deviation of $s_2 = 4$. 
At $\alpha = .10$, can we support the claim that the two populations have different mean IQs ?

13. For the paired data below, decide whether the (Pearson) correlation coefficient $r$ between 
$x$ and $y$ values is 
(a) close to 1  (b) close to 0  (c) close to $-1$
14. For the data plotted below, draw (visually) a best-fit line. Then write down an equation for the best-fit line you have drawn.

It is not necessary to calculate the least-squares best-fit line!