1. The following numbers of individuals in a company received special assistance from the personnel department last year:

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug/alcohol</td>
<td>10</td>
</tr>
<tr>
<td>Family crisis counseling</td>
<td>20</td>
</tr>
<tr>
<td>Other</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>50</strong></td>
</tr>
</tbody>
</table>

If you were to select someone at random from the records for last year, what is the probability that the person would be in each of the following categories (a) drug/alcohol, (b) family, (c) drug/alcohol or family, (d) any category except “other”, or (e) any of the three categories? Explain your answer to someone who has never had a course in statistics.

2. For the following two examples, a) say what two populations are being compared, b) state the research hypothesis, c) state the null hypothesis and d) state whether a one or two tailed test is more appropriate and why. (There is not one right answer!)

   a) Based on anthropological reports in which the status of women is scored on a 10 point scale, the mean and standard deviation across many cultures are known. A new culture is found in which there is an unusual family arrangement. The status of women is also rated into this culture. Do cultures with the unusual family arrangements provide higher status to women than cultures in general?

   b) Do people who live in big cities develop more stress related conditions than people in general?

3. For each of the following samples in which participants were given an experimental treatment, test whether they scored significantly higher than the general population: 1) a sample of 100 with a mean of 82, b) a sample of 10 with a mean of 84. The general population of individuals has a mean of 81, a standard deviation of 8 and follows a normal curve. Carry out the full five steps of hypothesis tests (using the .05 statistical significance level).

4. A psychologist is interested in the conditions that affect the number of dreams per month that people report in which they are alone. We will assume that based on extensive previous research, it is known that in the general population, the number of such dreams per month follows a normal curve, with the population mean $= 5$ and the standard deviation $= 4$. The researcher wants to test the prediction that the number of such
dreams will be greater among people who have recently experienced a traumatic event. The psychologist studies 36 individuals who have recently experienced a traumatic event and has them keep a record of their dreams for a month. Their mean number of alone dreams is 8. Should you conclude that people with recent traumatic experiences have more dreams in which they are alone? 1) Carry out the steps of hypothesis testing (using the .05 level). 2) Explain your answer to a person who has never had a course in statistics.

5. For each of the following studies, make a chart of four possible correct and incorrect decisions, and explain what each should mean. Each chart should be laid out like the class handout, but with the appropriate variable names for the particular example:
   a) a study of whether increasing the amount of recess time improves schoolchildren’s in-class behavior.
   b) a study comparing individuals who have been in psychotherapy to the general public to see if they are more tolerant of other people’s upsets than the general population.
   c) For each example, what error do you see as the biggest problem and why? (There is not one right answer!)

6. For a population that has a standard deviation of 10, figure the standard deviation of the distribution of means for samples of size (a) 2, (b) 3, (c) 4 and (d) 9. Figure the 95% confidence interval (that the lower and upper confidence limits for each sample size. Assume that the researcher’s sample has a mean of 100 and that population of individuals is known to follow a normal cuvee.

7. You read a study in which the result is significant (p<.05). You then look at the size of the sample. If the sample is very very large (rather than very small), how should this affect your interpretation of
   a) the probability that the null hypothesis is actually true
   b) the practical importance of the result

Imagine the person reading your answer does not understand effect size or power (but vaguely understands statistical significance).

8. In Aron et al (1997), researchers put pairs of strangers together and asked them to talk about intimate topics for 45 minutes. Afterwards, the participants rated how close they felt to other person. One key question is whether the rating of closeness would be influenced by how similar participants’ attitudes on a pre-questionnaire were. The authors report that “there was no significant difference” in closeness for similar and non-similar pairs of strangers. They then argue that this study had 90% power for detecting large and medium effects – and that the other effects found were large (d=.80), therefore it seems unlikely that attitude similarity has anything more than a very small effect on feelings of closeness.

Explain this result to someone who does not understand effect size or power (but does understand statistical significance).
9. You are planning a study that you compute as having quite low power. Name six things that you might do to increase power.

10. As part of a larger study, Speed and Gangstead (1997) collected ratings and nominations on a number of characteristics for 66 fraternity men from their fellow fraternity members. The following paragraph is taken from their Results section:

…men’s romantic popularity significantly correlated with several characteristics; best dressed ($r = .48$), most physically attractive ($r = .47$), most outgoing ($r = .47$), most self-confident ($r = .32$), and most independent ($r = .38$). Unexpectedly, however, men’s potential for financial success did not significantly correlate with romantic popularity ($r = .10$).

Explain these results as if you were writing to a person who has never had a course in statistics. Specially, (a) explain what is mean by a correlation coefficient using one of the correlations as an example; (b) explain in a general way what is meant by “significantly” and “not significantly”, referring to at least one specific example; (c) speculate on the meaning of the pattern of results, taking into account the issue of direction of causality and (d) evaluate the strength of these results by using one of the correlations as an example (refer to Cohen’s definition of effect size and convert the effect to percent of variance accounted for).