

### Answers to add numbered problems:

1) You want to compare estrogen levels in large cats. You have two samples here, one for leopards and one for jaguars (each sample has 12 measurements). Since you have two samples, you want to do some kind of two sample test. Since the problem tells you that the data are normal, a two sample  $t$ -test is most appropriate (note that the data are NOT paired - there is no relationship between the first leopard and the first jaguar in your data). You probably know *nothing* about estrogen levels in large cats, so a the test should be two sided.

3) You catch three different species of minnow, and for each species you measure length. The obvious thing to notice is that you have three samples. We did not learn any procedures/tests to deal with three samples so you can not answer this question (you were not taught how to deal with more than two samples).

5) It should be reasonably obvious that you want to compare height and lung volume. This is NOT a two sample test (does it make sense to test if height and lung volume are different? No, it doesn't (if this isn't clear to you, please think about it)). What might make sense instead is to figure out if lung volume is bigger for a taller person. How would you do this? One possibility is regression. Notice that it also makes sense to test if a taller person has a larger lung volume, so the regression test should be one sided (you certainly wouldn't expect a bigger person to have a smaller lung volume!).

7) Here you are basically counting the number of mice that get cancer if exposed to the carcinogen vs. the number of mice that get cancer when exposed to a control substance. Notice that your data is counts, not measurements. Since you have two factors (cancer: yes/no vs. carcinogen: yes/no), this should be analyzed with a contingency table test. You also expect more mice to get cancer when exposed to the carcinogen, so the test should be one sided (directional).

9) This one's a little silly since the answer is obvious. Still, you have two samples (37 men and 37 women). The data are not paired (the first man has no relation to the first woman). Your measurement is how much weight each person can lift with their right arm, so the answer is most likely a  $t$ -test again (notice that a sample size of  $n_1 = 37$  and  $n_2 = 37$  is probably large enough so we don't have to worry about whether or not the data are normal (unless they're seriously not normal)). The test is one sided since we expect men to be stronger (on average).