Confidence Intervals

	Mean	Proportion
Single group	"A sample of n CBS students reported their starting salaries after graduation. The resulting sample mean was $\overline{X}$, and the sample standard deviation was s. Find an $\alpha\,\%$ confidence interval on the *population* mean starting salary after graduation" $\overline{X} \pm z_{(1-\alpha)/2}\frac{s}{\sqrt{n}}$ **Important:** If $n < 30$, use $t_{n-1,(1-\alpha)/2}$ instead of $z_{(1-\alpha)/2}$, unless you know the data is normally distributed.	"A sample of n CBS students were asked whether they liked chocolate. A proportion $\hat{p}$ of sampled students said they did. Find an $\alpha\,\%$ confidence interval on the *population* proportion of students that like chocolate" $\hat{p} \pm z_{(1-\alpha)/2}\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$ **Important**: in some cases, you will be asked to find the required n to obtain a certain level of accuracy, without being told what p to use. In these cases, use $p = 0.5$.
Comparing two groups with *matched* measurements	"A sample of n CBS students took test 1 and test 2. The sample mean for tests 1 and 2 were $\overline{X}_1$ and $\overline{X}_2$ respectively. For each student, the difference between the two scores was calculated, and these differences were found to have a sample standard deviation s_D. Find an $\alpha\,\%$ confidence interval on the *population* difference between the mean score on the two tests" $(\overline{X}_1 - \overline{X}_2) \pm z_{(1-\alpha)/2}\frac{s_D}{\sqrt{n}}$	N/A
Comparing two groups with *independent* measurements	"A sample of n_1 CBS students from the class of 2012 took a test. Their sample mean score was $\overline{X}_1$ and their sample standard deviation was s_1. A sample of n_2 students from the class of 2013 did the same, with sample statistics $\overline{X}_2$ and s_2. Find an $\alpha\,\%$ confidence interval on the *population* difference between the mean performance of their two classes" $(\overline{X}_1 - \overline{X}_2) \pm z_{(1-\alpha)/2}\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$	"A sample of n_1 CBS students from the class of 2012 were asked if their liked chocolate. The proportion that did like chocolate was $\hat{p}_1$. A sample of n_2 students were taken from the class of 2013, and the proportion there was $\hat{p}_2$. Find an $\alpha\,\%$ confidence interval on the *population* difference between the proportion of students from each class that like chocolate" $(\hat{p}_1 - \hat{p}_2) \pm z_{(1-\alpha)/2}\sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$

Questions, corrections – email guetta@cantab.net