ANSWERS CHAPTER 7

THINK IT OVER

think it over

TIO 7.1: The sample data is used as a model for the population and as such just resembles it. It is not an exact copy so you would expect the sample proportion to be different from the population.

TIO 7.2: If you sampled without replacement you would end up reducing the size of the population from which the sample is taken. This runs the risk of distorting the data.

TIO 7.3: No, because the population size minus the sample size can never be greater than the population minus 1.

In other words, you have made a mistake with your calculation if you get a figure of 1 or above.

TIO 7.4: The sample size is the same as the population, i.e. not a sample.

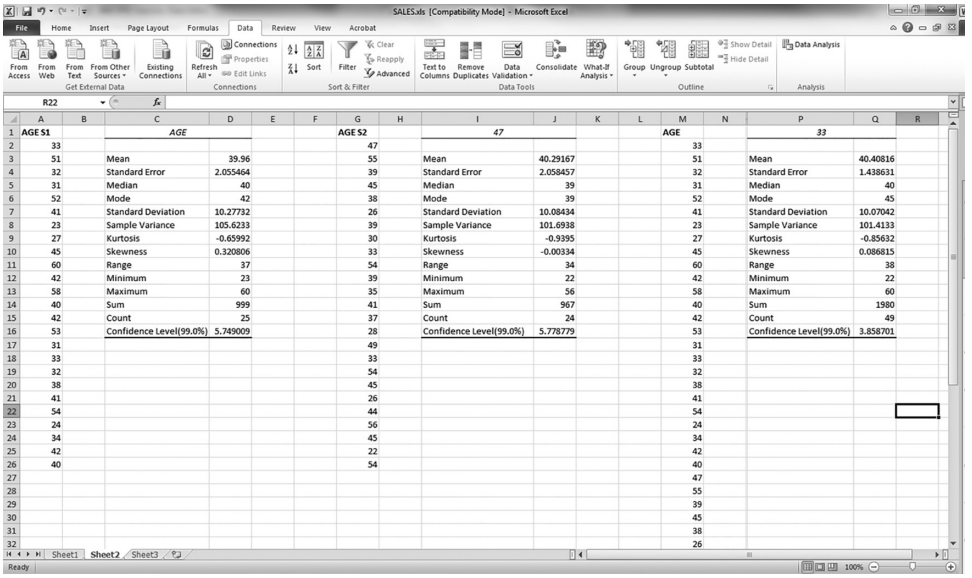
TIO 7.5: No answer required.

TIO 7.6: No answer required.

EXERCISES

1. Central Limit Theorem (the mean of the means would approach a normal distribution).
2. (a) All students had the same average ability. Both classes were taught by lecturers of similar abilities.
   (b) H_0: $\mu_a = \mu_b$, H_1: $\mu_a > \mu_b$. where *a* is the new teaching method group. At a significance level of 5%, $z = 0.962$, i.e. no significant evidence. One-tailed test.
3. (a) H_0: $\mu_a = \mu_b$, H_1: $\mu_a > \mu_b$.
   (b) At 10% 2.63 > 1.372, at 5% 2.63 > 1.812, at 1% 2.63<2.764.

   Depending on the required degree of confidence, it looks like the Acid Accountant is serving short measures. Eddie is correct, for a change! But Esha argues she is right at the 1% significance level.
4. (a) 384.
   (b) 600.
5. (a) 1756.
   (b) No they would require at least 376 students.
6. No answer required.
7. No answer required.
8. (a), (b) and (c)



AGE S1		AGE			AGE S2		47			AGE		33		
33					47					33				
51		Mean	39.96		55		Mean	40.29167		51		Mean	40.40816	
32		Standard Error	2.055464		39		Standard Error	2.058457		32		Standard Error	1.438631	
31		Median	40		45		Median	39		31		Median	40	
52		Mode	42		38		Mode	39		52		Mode	45	
41		Standard Deviation	10.27732		26		Standard Deviation	10.08434		41		Standard Deviation	10.07042	
23		Sample Variance	105.6233		39		Sample Variance	101.6938		23		Sample Variance	101.4133	
27		Kurtosis	-0.65992		30		Kurtosis	-0.9395		27		Kurtosis	-0.85632	
45		Skewness	0.320806		33		Skewness	-0.00334		45		Skewness	0.086815	
60		Range	37		54		Range	34		60		Range	38	
42		Minimum	23		39		Minimum	22		42		Minimum	22	
58		Maximum	60		35		Maximum	56		58		Maximum	60	
40		Sum	999		41		Sum	967		40		Sum	1980	
42		Count	25		37		Count	24		42		Count	49	
53		Confidence Level(99.0%)	5.749009		28		Confidence Level(99.0%)	5.778779		53		Confidence Level(99.0%)	3.858701	
31					49					31				
33					33					33				
32					54					32				
38					45					38				
41					26					41				
54					44					54				
24					56					24				
34					45					34				
42					22					42				
40					54					40				
										47				
										55				
										39				
										45				
										38				
										26				

(d) Yes. The margins of error for (a) and (b) are similar.

(e) With a greater sample size the margin of error is smaller, meaning the summary statistics are more reliable.