* Independent large population mean 9.13
* Independent small population mean 9.19
* Matched Pairs large population mean 9.38
* Matched Pairs small population mean 9.41
* Large Independent population proportion 9.59

#9.7

1. µ x(bar)1 = 14

σ x(bar)1 = 4/ √14 = .4

1. µx(bar)2 = 10

σ x(bar)2 = 10 / √3 =.3

1. µ x(bar)1 - x(bar)2 = µ1 -µ1= 10 – 14 = 4

σ (x(bar)1 - x(bar)2 ) = √ σ1/ n1 + σ2/ n2 = √ 42/100 + 32/100 = .5

1. The sampling distribution of x(bar)1 - x(bar)2 is approximately normal per the Central Limit Theorem. The sample size for x(bar)1 and x(bar)2 is 100 which is greater or equal to 30.

#9.13 Large Independent

1. μ1 is the mean test scores of students in the classroom using educational software

μ2 is the mean test scores of students in the classroom not using educational software

1. H0 : μ1 - μ2 = 0 the mean test scores of students in the classroom using educational software and students in the classroom not using educational software is the same

Ha : μ1 - μ2 > 0 the mean test scores of students in the classroom using educational software is higher than the mean test scores of students in the classroom not using educational software

1. The p-value is 0.62. This value is very large and we can not reasonably reject H0 the null hypothesis. There is no sufficient evidence to suggest the mean test scores of students in the classroom using educational software is higher than the mean test scores of students in the classroom not using educational software. This is consistent with the conclusion reached by the DOE.

#9.19 Small Independent

1. We are 95% confident the interval of the true mean difference of the FNE score between bulimic and normal female student is 0.60 less to 7.95 more.
2. In order for the interval of part a to be statistically valid the distribution of FNE score for bulimic and normal females is assumed to be normally distributed. It is also assumed the variance of the two independent samples are equal. The sample need to selected randomly and independent.

The variance of bulimic female group is 24.2064 and of normal female group is 27.9841. Both assumptions have been reasonably satisfied. The sample appear to be normally distributed.

#4.38 Large matched pair

1. μ1 is the mean BMI of 76 campers at start of an 8-week summer camp

μ2 is the mean BMI of 76 campers at end of an 8-week summer camp

The target parameter is μ1 - μ2 = μd, the difference in the mean BMI of 76 campers at start and end of 8-week summer camp

H0 : μ1 - μ2 = μd μd = 0 campers BMI is less at end of 8-week summer camp

Ha : μ1 - μ2 = μd  μd > 0 campers BMI is less at end of 8-week summer camp

1. A parried difference designed was used to collect the data. Each of the 76 campers had two observations: BMI before and after 8-week summer camp. The data should be analyzed as paired-difference z-test because it is a large sample where n >= 30 where n = 76 campers. The question only suggest t-test.
2. t = (x(bar)1 – x(bar)2 - D0 / √ σ2/ n1 + σ2/ n2 = 34.9 – 31.6 – 0 / √ 6.92/ 76 + 6.22/ 76 = 3.3 / √ 1.132 = 3.101
3. t = (X(bar)d – 0 )/ (sd / √ nd) = 3.3 – 0 / 1.5 / √76 = 3.3 / .0172 = 19.179
4. The t-statistic for paired-difference t-test provides more evidence in support of the alternative hypothesis.
5. p-value < .0001 at α = 0.01. This value is very small and we can reasonably reject H0 the null hypothesis in favor of the alternative hypothesis Ha. There is sufficiently strong evidence to suggest the mean BMI of 76 campers at start of camp is more than end of camp.
6. In order for the inference in part f to be valid the differences in BMI values need to be normally distributed.
7. α = 0.01 X(bar) ± zα σd/ √ nd = 3.3 ± 2.567 1.5/ √76 = 3.3 ± 0.172 = [3.1279, 3.472]

We are 99% confidence that the mean BMI difference is between 3.1279 and 3.472. D0 = 0 is not in the confidence interval.

#4.41 Small matched paired

1. μ1 is the mean BOLD score for 24 patients that did not received the cream during session 1

μ2 is the mean BOLD score for 24 patients that did received the cream (placebo) during session 2

BOLD is the blood oxygen level-dependent signal.

The target parameter is μ1 - μ2 = μd, the difference in the mean BOLD score between the 24 same patients for session 1 and session 2.

1. A parried difference designed was used to collect the data. Each of the 24 patients had two observations. In both session 1 and 2 patients received an electronic shocks. During session 2 patients received a cream (placebo). This experiment was conducted to test the placebo effect.
2. H0 : μ1 - μ2 = μd μd = 0 Placebo is not effective in reducing pain

Ha : μ1 - μ2 = μd  μd > 0 Placebo is effective in reducing pain

1. t = (X(bar)d – 0 )/ (sd / √ nd) = .21 – 0 / .47 / √24 = .21 / .095 = 2.19
2. p-value: .02 α = 0.05
3. df = 24 – 1 = 23 t .05 = 1.714

t > 1.714 (rejection region)

The test statics falls in the rejection region t = 2.19 > 1.714. H0 is rejected in favor of Ha. There is sufficient evidence to suggest that the placebo effect is effective at reducing pain at α = 0.05. The 0.01 > p-value > 0.025

#9.59 Large Independent population proportion

2000 elementary school children were surveyed

1. n (boys) = 1358 p(hat – boy) = 746 / 1358 = 0.54933 = 0.549
2. b. n(girls) = 1379 p(hat – girl) = 967 / 1379 = 0.70123 = 0.701
3. p(hat – boy) – p(hat – girl ) = 0.549 - 0.701 ± 1.645 √ 0.549 (1-0.549)/1358 + 0.701 (1-0.701)/1379

-0.152 ± 1.645 x 0.18 = -0.152 ± 0.030 = [-0.182, -0.1219]

We are 90% confident that the difference in proportions between Dutch boys and Dutch girls who never bullied is 0.122 and 0.182 less. We are confident the proportion of girls that never bully is greater than the proportion of boys that never bully.

1. Dutch Boys are more likely to bully than Dutch girls based on the survey conducted.