Pre-Calculus Multiple Choice Questions - Chapter S10

1 A researcher believes that a new diet should improve weight gain in laboratory mice. If the average gain for 12 mice on the new diet is 5.3 ounces with a standard deviation of 0.5 ounces, while 15 control mice on the old diet gain an average of 5 ounces with a standard deviation of 0.4 ounces, where is the p-value?

| | S10.1 |

a Below 0.01   **b** Between 0.01 and 0.025

c Between 0.025 and 0.05   **d** Between 0.05 and 0.10

e Over 0.10

2 An anthropologist believes that human skull sizes increased between two time periods. He plans to randomlly sample 30 skulls from each period and will reject any equality claim if the mean skull circumference in the second time period sample is at least one inch greater than the mean skull circumference from the first period sample. If the standard deviation of skull circumference in all time periods is known to be 2.3 inches, what is the probability the anthropologist will mistakenly reject a correct null hypothesis of equality?

| | S10.1 |

a 0.009   **b** 0.023

c 0.046   **d** 0.594

e There is insufficient information given to calculate this probability

1 To test whether husbands or wives have greater manual agility, a SRS of 50 married couple is chosen. All 100 people are given a one-minute period to find and place strangely shaped pegs into matching holes. What is the conclusion at the five percent significance level if a two-sample hypothesis test, H_o: $\mu_1 - \mu_2 = 0$, H_a: $\mu_1 - \mu_2 \neq 0$, results in a p-value of 0.15

| | S10.1 |

a The observed difference between husbands and wives is significant

b The observed difference is not significant

c A conclusion is not possible without knowing the mean number of pegs placed by husbands and wives

d A conclusion is not possible without knowing both the mean and standard deviation of the number of pegs placed by husbands and by wives

e A two-sample hypothesis test should not be used in this example.

Pre-Calculus Multiple Choice Questions - Chapter S10

1 Twelve runners are asked to run a 10 kilometer race on each of two consecutive weeks. In one of the races runners wear one brand on show and in the other a second brand. The brand they wear in each race is determined at random. To determine if there is evidence that the mean time using brand 1 is less than the mean time using brand 2, you should use

a	Two-sample t-test	**b**	One-sample t-test
c	Matched pairs t-test	**d**	Any of the above

S10.2

2 The main reason to use a matched-pairs t-test is to _____ natural variability.

a	Increase	**b**	Decrease
c	Maintain	**d**	None of the above

S10.2

3 A pairs design _____ experimental error?

a	Increases	**b**	Reduces
c	Doesn't affect	**d**	Cannot be determined

S10.2

1 In a random servey of 500 women, 315 said they would rather be poor and thin than rich and fat; in a survey of 400 men, 220 said they would rather be poor and thin rather than rich and fat. Is there

Is there sufficient evidence to show that the proportion of women who would rather be poor and thin than rich and fat is greater than the proportion of men that would rather be poor and thin than rich and fat?

	S10.3

a Because 0.63 > 0.55 there is strong evidence that the proportion of women is greater than that of men

b Because 0.0075 < 0.01 there is very strong evidence that the proportion of women is greater than men

c Because 0.01 < 0.0329 < 0.05 there is strong evidence that the proportion of women is greater than men

d There is insufficient evidence that the proportion of women is greater than that of men

e There is insufficient information to determine whether the proportion of women is greater than men

2 A survey of 1000 Americans reveals that 525 believe that whales are an endangered animal and should have protection from the fishing industry. In a survey of 750 Japanese, 325 believe that whales are endangered and should be protected. To test at the 5 percent significance level whether or not the data are significant evidence that the proportion of Japanese who believe that whales need protection is less than the proportion of Americans with this belief, a student sets up the following:

H_o: p = 0.525 and H_a: p < 0.525

where p is the proportion of Japanese who believe that whales need protection. Which of the following is a true statement?

	S10.3

a The student has set up a correct hypothesis test

b Given the large sample sizees, a one percent significance level would be more appropriate

c A two-sided test would be more appropriate

d Given that (525 + 325) / (1000 + 750) = 0.486, H_a: p < 0.486 would be more appropriate

e A two-population difference in proportions hypothesis test would be more appropriate.

1 Should there be more restrictions on hamburgers? In a 1925 pre-McDonald's survey, 255 out of 1020 adults answered in the affirmative; in a 2000 during-McDonald's survey, 352 out of 1100 answered affirmatively. Establish a 90 percent confidence interval estimate of the differnce between the proportions of adults in 1995 and 2000 who support more restrictions on hamburgers

	S10.3

a -0.102 through -0.038   **b** -0.09 through -0.05

c -0.108 through -0.032   **d** -0.094 through -0.046

e -0.120 through -0.020

1 An investigator was studying a territorial species of Central American termites, Nasutilermes corniger. Forty-nine termite pairs were randomly selected; both members of each of these pairs were from the same colony. Fifty-five additional termite pairs were randomly selected; the two members in each of these pairs were from different colonies. The pairs were placed in petri dishes and observed to see whether they exhibited aggressive behavior. The results are shown in the table below.

Colony?	Aggressive	Nonagressive	Total
Same	40 (33.5)	9 (15.5)	49
Different	31 (37.5)	24 (17.5)	55
Total	71	33	104

A chi-square test for homogeneity was conducted, resulting in $x^2 = 7.638$. The expected counts are shown in parantheses in the table. Which of the following sets of statements follows from these results?

a x^2 is not significant at the 0.05 level

b x^2 is significant, $0.01 < p < 0.05$; the counts in the table suggest that termite pairs from the same colony are less likely to be aggressive than termite pairs from different colonies

c x^2 is significant, $0.01 < p < 0.05$; the counts in the table suggest that termite pairs from different colonies are less likely to be aggressive than termite pairs from the same colony

d x^2 is significant, $p < 0.01$; the counts in the table suggest that termite pairs from the same colony are less likely to be aggressive than termite pairs from different colonies

e x^2 is significant, $p < 0.01$; the counts in the table suggest that termite pairs from different colonies are less likely to be aggressive than termite pairs from the same colony

	S10.4

2 A highway superintendent states that five bridges into a city are used in the ratio 2:3:3:4 during the morning rush hour. A highway study of an SRS of 6000 cars indicates that 920, 1570, 1480, and 2030 cars use the five bridges, respectively. Can the superintendent's claim be rejected at the 1 or 5 percent level of significance?

a There is sufficient evidence to reject the claim at either of these two levels

b There is sufficient evidence to reject the claim at the 1 percent level, but not at the 5 percent level

c There is sufficient evidence to reject the claim at the 5 percent level, but not at the 1 percent level

d There is not sufficient evidence to reject the claim, at either of these two levels

e There is not sufficient information to answer this question

	S10.4

3 A study of accidents at a large factory reported the following numbers by shift:

		S10.4

Shift	Morning	Afternoon	Night
Accidents	35	77	53

Is there sufficient evidence to say that the numberso f accidents on the three shifts are not the same?

a There is sufficient evidence at the 0.001 significance level that the number of accidents on each shift are not the same

b There is sufficient evidence at the 0.01 level, but not at the 0.001 level, that the number of accidents on each shift are not the same

c There is sufficient evidence at the 0.05 level, but not at the 0.01 level, that the number of accidents on each shift are not the same

d There is sufficient evidence at the 0.10 level, but not at the 0.05 level, that the number of accidents on each shift are not the same

e There is not sufficient evidence to say that the number of accidents on each shift are not the same