Ch 8.2 - 8.4 worksheet

1. **Solve the problem. Assume that a test will be conducted of the claim that two samples come from populations with the same mean. Assume that the samples are independent and have been randomly selected.**

Samples are taken from two populations, A and B, with the following results.

	A	B
Sample size	100	200
Sample mean	25	23
Sample variance	1.21	1.01

You wish to test the following hypothesis at the 1 percent level of significance:

H_0: $\mu_1 = \mu_2$ against H_1: $\mu_1 \neq \mu_2$.

What decision rule would you use?

- Reject H_0 if test statistic > 2.575.
- Reject H_0 if test statistic < -2.575.
- Reject H_0 if test statistic < 2.575 and > -2.575.
- Reject H_0 if test statistic < -2.575 or > 2.575.

2. **Construct the indicated confidence interval for the difference between the two population means. Assume that the two samples are independent and that they have been randomly selected.**

When 59 American and 47 European golf pros played a round of golf, the following information was gathered. Find a 90% confidence interval for $\mu_A - \mu_E$.

	Sample mean	Sample standard deviation
American	A	C
European	B	D

A = 74.80 B = 68.01
C = 2.45 D = 3.23

- (5.67, 7.91)
- (5.85, 7.73)
- (5.88, 7.70)
- (-7.73, -5.85)

3. Find the test statistic to test the claim that $\mu_1 = \mu_2$. Two samples are randomly selected from each population. The sample statistics are given below. Use $\alpha = .05$.

group #1	group #2
$n = 35$	$n = 42$
$\bar{x} = 24.32$	$\bar{x} = 26.87$
$s = 2.9$	$s = 2.8$

a) -3.90 b) -3.16 c) -2.63 d) -1.66

4. **The two data sets are dependent. Find $\bar{d}$ to the nearest tenth.**

X	229	197	220	182	266	299	302
Y	176	133	195	153	240	268	284

- 35.2
- 211.2
- 45.8
- 21.1

5. **Find s_d.**

The differences between two sets of dependent data are 0.22 0.4 0.32 0.32 0.3. Round to the nearest hundredth.

- 0.18
- 0.03
- 0.09
- 0.06

6. **Assume that you want to test the claim that the paired sample data come from a population for which the mean difference is $\mu_d = 0$. Compute the value of the t test statistic.**

The following table shows the weights of nine subjects before and after following a particular diet for two months. You wish to test the claim that the diet is effective in helping people lose weight. What is the value of the appropriate test statistic?

Subject	A	B	C	D	E	F	G	H	I
Before	168	180	157	132	202	124	190	210	171
After	162	178	145	125	171	126	180	195	163

- 0.351
- 1.052
- 9.468
- 3.156

7. **Determine the decision criterion for rejecting the null hypothesis in the given hypothesis test; i.e., describe the values of the test statistic that would result in rejection of the null hypothesis.**

We wish to compare the means of two populations using paired observations. Suppose that $\bar{d} = 3.125$, $s_d = 2.911$, and $n = 8$, and that you wish to test the following hypothesis at the 5 percent level of significance:

H_0: $\mu_d \leq 0$ against H_1: $\mu_d > 0$.

What decision rule would you use?

- Reject H_0 if test statistic is greater than -1.895.
- Reject H_0 if test statistic is greater than -1.895 and less than 1.895.
- Reject H_0 if test statistic is greater than 1.895.
- Reject H_0 if test statistic is less than 1.895.

8. **Construct a confidence interval for μ_d, the mean of the differences d for the population of paired data. Assume that the population of paired differences is normally distributed.**

A test of writing ability is given to a random sample of students before and after they completed a formal writing course. The results are given below. Construct a 99% confidence interval for the mean difference between the before and after scores.

Before	70	80	92	99	93	97	76	63	68	71	74
After	69	79	90	96	91	95	75	64	62	64	76

- $1.2 < \mu_d < 2.8$
- $-0.1 < \mu_d < 4.1$
- $-0.5 < \mu_d < 4.5$
- $-0.2 < \mu_d < 4.2$

9. **Find the number of successes x suggested by the given statement.**

A computer manufacturer randomly selects 2690 of its computers for quality assurance and finds that 2.6% of these computers are found to be defective.

- 75
- 73
- 70
- 68

10. **From the sample statistics, find the value of $\bar{p}$ used to test the hypothesis that the population proportions are equal.**

Use a 0.01 significance level to test the claim that the proportion of men who plan to vote in the next election is the same as the proportion of women who plan to vote. Results of a survey are

	Men	Women
Plan to vote	170	185
Do not plan to vote	130	115

- 0.391
- 0.586
- 0.592
- 0.195

11. Find the test statistic to estimate z, to test the claim $p_1 - p_2 \leq 0$. Use $\alpha = .01$.

group #1	group #2
n = 100	n = 140
x = 38	x = 50

a) 2.116 b) .362 c) 1.324 d) .638

12. **Given the hypothesis and the sample data, find the decision criterion that would be used for rejecting the null hypothesis. Assume that the samples are independent and that they have been randomly selected. Assume that $np \geq 5$ and $nq \geq 5$ for both samples.**

The table shows the number of people having a certain characteristic in samples from two different populations.

Sample	1	2
Sample size	80	100
Number with characteristic	40	53

We wish to test the hypothesis at the 10 percent level of significance:
H_0: $p_1 \geq p_2$ against H_1: $p_1 < p_2$.

What decision rule would you use?

- Reject H_0 if test statistic is greater than -1.28.
- Reject H_0 if test statistic is less than 1.28.
- Reject H_0 if test statistic is less than -1.28.
- None of the above is correct.

13. **Find the appropriate p-value to test the null hypothesis, H_0: $p_1 = p_2$, using a significance level of 0.05.**

$n_1 = 100$ $n_2 = 140$
$x_1 = 41$ $x_2 = 35$

- .4211
- .0021
- .0512
- .0086

14. **Construct the indicated confidence interval for the difference between population proportions $p_1 - p_2$. Assume that the samples are independent and that they have been randomly selected.**

In a random sample of 300 women, 50% favored stricter gun control legislation. In a random sample of 200 men, 25% favored stricter gun control legislation. Construct a 98% confidence interval for the difference between the population proportions $p_1 - p_2$.

- $0.152 < p_1 - p_2 < 0.348$
- $0.168 < p_1 - p_2 < 0.332$
- $0.141 < p_1 - p_2 < 0.359$
- $0.164 < p_1 - p_2 < 0.336$