Student: _____	Instructor: Andreas Lazari	Assignment: Chapter 11.3-Homework
Date: _____	Course: Math2620 F - Fall 2018	

1. A random sample of 40 adults with no children under the age of 18(Group 1) results in a mean daily leisure time of 5.14 hours, with a standard deviation of 2.28 hours. A random sample of 40 adults with children under the age of 18 (Group 2) results in a mean daily leisure time of 4.22 hours, with a standard deviation of 1.68 hours. Construct and interpret a 95% confidence interval for the mean difference in leisure time between adults with no children and adults with children $(\mu_1 - \mu_2)$.

use 2-Sample T-Interval ⇒ (0.02728, 1.8127)

Let μ_1 represent the mean leisure hours of adults with no children under the age of 18 and μ_2 represent the mean leisure hours of adults with children under the age of 18.

Note: on the calculo always choos No for Pooled

The 95% confidence interval for $(\mu_1 - \mu_2)$ is the range from 0.03 hours to 1.81 hours.
(Round to two decimal places as needed.)

What is the interpretation of this confidence interval?

- ○ **A.** There is 95% confidence that Group 1 will have a daily leisure time of _____ to _____ hours **LOWER** than Group 2.
- ○ **B.** There is 95% confidence that Group 1 has the same daily leisure time as Group 2.
- ● **C.** There is 95% confidence that Group 1 will have a daily leisure time of 0.03 to 1.81 hours **HIGHER** than Group 2.
- ○ **D.** None of These

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2. Two researchers conducted a study in which two groups of students were asked to answer 42 trivia questions from a board game. The students in group 1 were asked to spend 5 minutes thinking about what it would mean to be a professor, while the students in group 2 were asked to think about soccer hooligans. These pretest thoughts are a form of priming. The 200 students in group 1 had a mean score of 22.7 with a standard deviation of 4.3, while the 200 students in group 2 had a mean score of 18.4 with a standard deviation of 3.3. Complete parts **(a)** and **(b)** below.

(a) Determine the 95% confidence interval for the difference in scores, $\mu_1 - \mu_2$. Interpret the interval.

(3.546 , 5.054)
(Round to three decimal places as needed.)

2-Sample T-Interval
(3.5463, 5.053 ≠)

(b) Interpret the interval. Choose the correct answer below.

- ○ **A.** The researchers are 95% confident that Group 1 on the average will answer (_____ to _____) **LOWER** than Group 2.
- ● **B.** The researchers are 95% confident that Group 1 on the average will answer (3.546 to 5.054) **HIGHER** than Group 2.
- ○ **C.** The researchers are 95% confident that $\mu_1 = \mu_2$
- ○ **D.** None of These

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3. Assume that both populations are normally distributed. Construct a 90% confidence interval about $\mu_1 - \mu_2$.

	Sample 1	Sample 2
n	10	10
$\bar{x}$	12.7	11.7
s	3.1	3

Two Sample T-Interval:

Construct a 90% confidence interval about $\mu_1 - \mu_2$.

(-1.366, 3.3657)

The confidence interval is the range from -1.37 to 3.37.
(Round to two decimal places as needed. Use ascending order.)

4. Use the given statistics to complete parts (a) and (b). Assume that the populations are normally distributed.
Test whether $\mu_1 > \mu_2$ at the $\alpha = 0.01$ level of significance for the given sample data.

	Population 1	Population 2
n	26	21
$\bar{x}$	50.2	40.5
s	6.2	14.1

Two Sample T-Test

(a) Identify the null and alternative hypotheses for this test.

- ○ **A.** $H_0: \mu_1 = \mu_2$, $H_1: \mu_1 > \mu_2$
- ○ **B.** $H_0: \mu_1 = \mu_2$, $H_1: \mu_1 \neq \mu_2$
- ○ **C.** $H_0: \mu_1 \neq \mu_2$, $H_1: \mu_1 = \mu_2$
- ○ **D.** $H_0: \mu_1 = \mu_2$, $H_1: \mu_1 < \mu_2$
- ○ **E.** $H_0: \mu_1 > \mu_2$, $H_1: \mu_1 = \mu_2$
- ○ **F.** $H_0: \mu_1 < \mu_2$, $H_1: \mu_1 = \mu_2$

$t_0 = 2.931918 \approx 2.93$

P-Value $= 0.0034516 \approx 0.003$

Find the test statistic for this hypothesis test.

2.93 (Round to two decimal places as needed.)

Determine the P-value for this hypothesis test.

0.003 (Round to three decimal places as needed.)

State the conclusion for this hypothesis test.

Since P-Value $= 0.003 < \alpha = 0.01$
Reject H_0.

- ○ **A.** Do not reject H_0. There is not sufficient evidence at the $\alpha = 0.01$ level of significance to conclude that $\mu_1 > \mu_2$.
- ○ **B.** Do not reject H_0. There is sufficient evidence at the $\alpha = 0.01$ level of significance to conclude that $\mu_1 > \mu_2$.
- ○ **C.** Reject H_0. There is not sufficient evidence at the $\alpha = 0.01$ level of significance to conclude that $\mu_1 > \mu_2$.
- ● **D.** Reject H_0. There is sufficient evidence at the $\alpha = 0.01$ level of significance to conclude that $\mu_1 > \mu_2$.

5. Test whether $\mu_1 < \mu_2$ at the $\alpha = 0.02$ level of significance for the sample data shown in the accompanying table. Assume that the populations are normally distributed.
[1] Click the icon to view the data table.

Determine the null and alternative hypothesis for this test.

- ○ **A.** $H_0: \mu_1 = \mu_2$
  $H_1: \mu_1 \neq \mu_2$
- ○ **B.** $H_0: \mu_1 \neq \mu_2$
  $H_1: \mu_1 < \mu_2$
- ○ **C.** $H_0: \mu_1 < \mu_2$
  $H_1: \mu_1 = \mu_2$
- ● **D.** $H_0: \mu_1 = \mu_2$
  $H_1: \mu_1 < \mu_2$

Two sample T-Test

$t_0 = -3.235328$

P-value = $P = 0.0010826$
$\approx P = 0.001$

Detemine the P-value for this hypothesis test.

P = 0.001 (Round to three decimal places as needed.)

since P-value $= 0.001 < \alpha = .02$
we reject H_0.

State the appropriate conclusion. Choose the correct answer below.

- ● **A.** Reject H_0. There is sufficient evidence at the $\alpha = 0.02$ level of significance to conclude that $\mu_1 < \mu_2$.
- ○ **B.** Do not reject H_0. There is not sufficient evidence at the $\alpha = 0.02$ level of significance to conclude that $\mu_1 < \mu_2$.
- ○ **C.** Reject H_0. There is not sufficient evidence at the $\alpha = 0.02$ level of significance to conclude that $\mu_1 < \mu_2$.
- ○ **D.** Do not reject H_0. There is sufficient evidence at the $\alpha = 0.02$ level of significance to conclude that $\mu_1 < \mu_2$.

1: Sample Data

	Population 1	Population 2
n	31	25
$\bar{x}$	103.4	114.5
s	12.2	13.2

6. Do people walk faster in the airport when they are departing (getting on a plane) or when they are arriving (getting off a plane)? A reputable researcher measured the walking speed of random travelers in two International Airports. His findings are summarized in the table. Answer the questions below.
[2] Click the icon to view the findings.

Do individuals walk at different speeds depending on whether they are departing or arriving at the $\alpha = 0.1$ level of significance? Let μ_1 represent the mean speed of people departing and μ_2 represent the mean speed of people arriving.

State the null and alternative hypothesis.

- A. $H_0: \mu_1 < \mu_2$; $H_1: \mu_1 > \mu_2$
- B. $H_0: \mu_1 = \mu_2$; $H_1: \mu_1 < \mu_2$
- C. $H_0: \mu_1 = \mu_2$; $H_1: \mu_1 > \mu_2$
- **D.** $H_0: \mu_1 = \mu_2$; $H_1: \mu_1 \neq \mu_2$

Two sample T-Interval
$t_0 = -1.4284439$
P-Value $= 0.1585776$
≈ 0.159

Determine the P-value for this hypothesis test.

P-value = 0.159 (Round to three decimal places as needed.)

Choose the correct conclusion.

- **A.** Do not reject H_0. There is not sufficient evidence at the $\alpha = 0.1$ level of significance to say that travelers walk at different speeds depending on whether they are arriving or departing.
- B. Do not reject H_0. There is sufficient evidence at the $\alpha = 0.1$ level of significance to say that travelers walk at different speeds depending on whether they are arriving or departing.
- C. Reject H_0. There is not sufficient evidence at the $\alpha = 0.1$ level of significance to say that travelers walk at different speeds depending on whether they are arriving or departing.
- D. Reject H_0. There is sufficient evidence at the $\alpha = 0.1$ level of significance to say that travelers walk at different speeds depending on whether they are arriving or departing.

Since P-value > α
$0.159 > 0.1$
We fail to Reject H_0

2: Walking Speed

Direction of Travel	Departure	Arrival
Mean speed (feet per minute)	256	270
Standard deviation (feet per minute)	49	31
Sample size	35	35

1. **0.03**

1.81

C.

There is 95% confidence that Group 1 will have a daily leisure time of **0.03** to **1.81** hours **HIGHER** than Group 2.

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2. 3.546

5.054

B.

The researchers are 95% confident that Group 1 on the average will answer (**3.546** to **5.054**) **HIGHER** than Group 2.

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3. − 1.37

3.37

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4. A. $H_0: \mu_1 = \mu_2 H_1: \mu_1 > \mu_2$

2.93

0.003

D. Reject H_0. There is sufficient evidence at the $\alpha = 0.01$ level of significance to conclude that $\mu_1 > \mu_2$.

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5. D. $H_0: \mu_1 = \mu_2 H_1: \mu_1 < \mu_2$

0.001

A. Reject H_0. There is sufficient evidence at the $\alpha = 0.02$ level of significance to conclude that $\mu_1 < \mu_2$.

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6. D. $H_0: \mu_1 = \mu_2 H_1: \mu_1 \neq \mu_2$

0.159

A.

Do not reject H_0. There is not sufficient evidence at the $\alpha = 0.1$ level of significance to say that travelers walk at different speeds depending on whether they are arriving or departing.
