- **1.** In a hypothesis test involving two-samples, the hypothesized difference in means must be 0.
 - O True
 - C False
- 2. The two-sample Z test can be used only if both population variances are known.
 - O True
 - C False
- **3.** In a two-sample Z test, both sample sizes must be large.
 - O True
 - C False
- **4.** Consider a hypothesis test or confidence interval concerning two population means when the variances are unknown and unequal. If the approximate number of degrees of freedom is a decimal, round down to the nearest integer.
 - O True
 - C False
- 5. The two-sample independent t test is robust.

○a. True

b. False

- 6. A paired t test is valid only if the underlying population variances are equal.
 - O True
 - C False

7. You want to compare the daily number of hits for two different MySpace page designs that advertise your indie rock band. You assign the next 30 days to either Design A or Design B, 15 days to each.

Would you use a one-sided or two-sided significance test for this problem?

- one-sided
- two-sided

Exposure to dust at work can lead to lung disease later in life. One study measured the workplace exposure of tunnel construction workers. Part of the study compared 115 drill and blast workers with 220 outdoor concrete workers.

Would you use a one-sided or two-sided significance test for this problem?

- O one-sided
- two-sided
- **8.** For each of the following experiments, determine whether the data are independent or paired.
 - School Board members believe that adding a teacher's aide to each K–4 class will improve classroom management and increase instruction time. Twenty-six elementary classrooms were selected at random, and the daily instruction time for each was recorded. A
 - 1. time for each was recorded. At teacher's aide was then added to each classroom, and the daily instruction time was recorded again. The data will be used to determine whether there is any evidence that adding a teacher's aide increases the mean daily instruction time.
- **a.** independent
- b. paired

Officials at the transit authority of a large city would like to compare the route times during morning and evening rush hours. Eleven routes were selected at random. A

2. morning and an evening route completion time were recorded for each. The data will be used to determine whether the mean evening route time is less than the mean morning route time.

> Random samples of 45 new home sites in Kansas and 45 new home sites in upstate New York were selected. The flatness coefficient (a unitless quantity between 0 and

3. 1) of each lot was measured. The data will be used to determine whether the mean flatness coefficient is less for new home sites in Kansas than in upstate New York.

A random sample of soccer players on the Brazil national team and a random sample of soccer players on the Argentina national team was obtained. The

4. amount of time (in minutes) each played during a World Cup match was obtained. The data will be used to determine whether the mean time is different for the two teams.

- **9.** Americans love hamburgers, but the high fat content in some cooked patties presents a severe health threat. Certain electric grills are designed to drain fat away from the patty, resulting in a healthier, although perhaps less tasty, meal. A random sample of ground beef packages with various fat contents was obtained. Two patties were made from each package. One was cooked in an electric grill, while the other was prepared in a frying pan on top of a stove. The fat content (as a percentage) is provided (the data is given in the next step). Should this situation be analyzed via 2-sample independent or 2-sample paired method?
 - two-sample independent
 - 2-sample paired

Americans love hamburgers, but the high fat content in some cooked patties presents a severe health threat. Certain electric grills are designed to drain fat away from the patty, resulting in a healthier, although perhaps less tasty, meal. A random sample of ground beef packages with various fat contents was obtained. Two patties were made from each package. One was cooked in an electric grill, while the other was prepared in a frying pan on top of a stove. The fat content (as a percentage) in each cooked patty is provided below:

cooking style x^{--} nsElectric17.025284.455Pan19.857285.929Electric-Pan-2.832284.291

Conduct the appropriate hypothesis test to determine whether the true mean fat content in hamburgers cooked on an electric grill is less than the true mean fat content of hamburgers cooked in a frying pan. (Assume normality and use $\alpha = 0.01$) What hypotheses should be used?

• $H_0: \mu_E - \mu_P = 0, H_a: \mu_E - \mu_P < 0$

- $H_0: \mu_D = 0, H_a: \mu_D < 0$
- H0: $\mu_{\rm E} \mu_{\rm P} < 0$, H_a: $\mu_{\rm E} \mu_{\rm P} = 0$
- $H_0: \mu_D < 0, H_a: \mu_D = 0$

Americans love hamburgers, but the high fat content in some cooked patties presents a severe health threat. Certain electric grills are designed to drain fat away from the patty, resulting in a healthier, although perhaps less tasty, meal. A random sample of ground beef packages with various fat contents was obtained. Two patties were made from each package. One was cooked in an electric grill, while the other was prepared in a frying pan on top of a stove.

The fat content (as a percentage) in each cooked patty is provided below:

cooking style	<i>x</i>	n	S
Electric	17.025	28	4.455
Pan	19.857	28	5.929
Electric-Pan	-2.832	28	4.291

Conduct the appropriate hypothesis test to determine whether the true mean fat content in hamburgers cooked on an electric grill is less than the true mean fat content of hamburgers cooked in a frying pan. (Assume normality and use $\alpha = 0.01$) The test statistic is (3 decimal places)

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Conduct the appropriate hypothesis test to determine whether the true mean fat content in hamburgers cooked on an electric grill is less than the true mean fat content of hamburgers cooked in a frying pan. (Assume normality and use $\alpha = 0.01$). If this is a 2-sample independent, df = 50.12.

The decision is

- \odot Fail to reject H₀
- O Accept H_a
- $^{\circ}$ Accept H₀
- O Reject H₀

Americans love hamburgers, but the high fat content in some cooked patties presents a severe health threat. Certain electric grills are designed to drain fat away from the patty, resulting in a healthier, although perhaps less tasty, meal. A random sample of ground beef packages with various fat contents was obtained. Two patties were made from each package. One was cooked in an electric grill, while the other was prepared in a frying pan on top of a stove.

The fat content (as a percentage) in each cooked patty is provided below:

cooking style	<i>x</i>	n	S
Electric	17.025	28	4.455
Pan	19.857	28	5.929
Electric-Pan	-2.832	28	4.291

Assume the underlying distributions are normal. Calculate the appropriate confidence interval or bound that corresponds with the hypothesis test above. Please use the confidence level that corresponds to $\alpha = 0.01$. If this is a 2-sample independent, df = 50.12. The confidence limit or bound is (<u>Answer 1</u>, <u>Answer 2</u>) (3 decimal places). If this is a bound, write 'infinity' for the other limit.

- 10. The curve in a hockey stick is measured by first placing the face of the blade against a flat surface. The maximum distance from the surface to the bottom of the blade cannot exceed 1/2 inch. Random samples of hockey sticks used by players on the Toronto Maple Leafs and Montreal Canadiens teams were obtained. The curve in each stick was measured (in inches), and the resulting data is presented in the next step. Should this situation be analyzed via 2-sample independent or 2-sample paired method?
 - two-sample independent
 - two-sample paired

The curve in a hockey stick is measured by first placing the face of the blade against a flat surface. The maximum distance from the surface to the bottom of the blade cannot exceed 1/2 inch. Independent random samples of hockey sticks used by players on the Toronto Maple Leafs and Montreal Canadiens teams were obtained. The curve in each stick was measured (in inches), and the resulting data are summarized in the table.

Team	$x^{}$	n	S
Toronto	0.361	15	0.122
Montreal	0.425	15	0.051

Toronto-Montreal -0.064 15 0.084

Assume the underlying distributions are normal. Is there any evidence to suggest that the mean curve in Toronto sticks is different from the mean curve in Montreal sticks? Use $\alpha = 0.01$.

What hypotheses should be used?

- \bigcirc $H_0: \mu_T \mu_M = 0; H_a: \mu_T \mu_M > 0$
- C $H_0: \mu_T \mu_M = 0; H_a: \mu_T \mu_M \neq 0$
- $H_0: \mu_D = 0, H_a: \mu_D \neq 0$
- $H_0: \mu_D = 0, H_a: \mu_D < 0$

The curve in a hockey stick is measured by first placing the face of the blade against a flat surface. The maximum distance from the surface to the bottom of the blade cannot exceed 1/2 inch. Independent random samples of hockey sticks used by players on the Toronto Maple Leafs and Montreal Canadiens teams were obtained. The curve in each stick was measured (in inches), and the resulting data are summarized in the table.

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Toronto-Montreal	-0.064	15	0.084

Assume the underlying distributions are normal. Is there any evidence to suggest that the mean curve in Toronto sticks is different from the mean curve in Montreal sticks? Use $\alpha = 0.01$.

The test statistic is _____ (3 decimal places)

The curve in a hockey stick is measured by first placing the face of the blade against a flat surface. The maximum distance from the surface to the bottom of the blade cannot exceed 1/2 inch. Independent random samples of hockey sticks used by players on the Toronto Maple Leafs and Montreal Canadiens teams were obtained. The curve in each stick was measured (in inches), and the resulting data are summarized in the table.

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Toronto	0.361	15	0.122
Montreal	0.425	15	0.051

Toronto-Montreal -0.064 15 0.084

Assume the underlying distributions are normal. Is there any evidence to suggest that the mean curve in Toronto sticks is different from the mean curve in Montreal sticks? Use $\alpha = 0.01$. If this is a 2-sample independent, df = 18.75. The decision is

- C Accept H_a
- C Reject H₀
- Fail to reject H₀
- C Accept H₀

The curve in a hockey stick is measured by first placing the face of the blade against a flat surface. The maximum distance from the surface to the bottom of the blade cannot exceed 1/2 inch. Independent random samples of hockey sticks used by players on the Toronto Maple Leafs and Montreal Canadiens teams were obtained. The curve in each stick was measured (in inches), and the resulting data are summarized in the table.

Team	$x^{}$	n	S
Toronto	0.361	15	0.122
Montreal	0.425	15	0.051

Toronto-Montreal -0.064 15 0.084

Calculate the appropriate confidence interval or bound that corresponds with the hypothesis test above. Please use the confidence level that corresponds to a = 0.01. If this is a 2-sample independent, df = 18.75.

Assume the underlying distributions are normal. The confidence limit or bound is $(\underline{Answer 1}, \underline{Answer 2})$ (3 decimal places). If this is a bound, write 'infinity' for the other limit.