A study was conducted to determine if the performance of a certain type of surgery on young horses had any effect on certain kinds of blood cell types in the animal. Fluid samples were taken from each of six foals before and after surgery. The samples were analyzed for the number of postoperative white blood cell (WBC) leukocytes. A preoperative measure of WBC leukocytes was also measured, with the accompanying results. Use a paired sample t-test to determine if there is a significant change in WBC leukocytes with the surgery.

Click here to view the leukocyte data.
Click here to view page 1 of the table of critical values of the t-distribution.
Click here to view page 2 of the table of critical values of the t-distribution.

Let sample 1 be the presurgery data, let sample 2 be the postsurgery data, and let $\mu_D = \mu_1 - \mu_2$. State the null and alternative hypotheses.

$H_0: \mu_D \ = \ 0$
$H_1: \mu_D \ \neq \ 0$

Determine the test statistic.

$t = \ -2.13$
(Round to two decimal places as needed.)

Determine the range into which the P-value falls.

$0.05 < \text{P-value} < 0.10$

State the proper conclusion. Use $\alpha = 0.05$.

There is no significant change in WBC leukocytes with the surgery. In general, H_0 would be rejected for significance levels greater than the P-value.

A study was made to determine whether more Italians than Americans prefer white champagne to pink champagne at weddings. Of the 400 Italians selected at random, 110 preferred white champagne, and of the 300 Americans selected, 65 preferred white champagne. Can we conclude that a higher proportion of Italians than Americans prefer white champagne at weddings? Use a 0.01 level of significance.

Click here to view page 1 of the standard normal distribution table.
Click here to view page 2 of the standard normal distribution table.

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- A. $H_0: p_1 = p_2$
  $H_1: p_1 \neq p_2$

- B. $H_0: p_1 < p_2$
  $H_1: p_1 = p_2$

- C. $H_0: p_1 > p_2$
  $H_1: p_1 = p_2$

- D. $H_0: p_1 \neq p_2$
  $H_1: p_1 = p_2$

- ★ E. $H_0: p_1 = p_2$
  $H_1: p_1 > p_2$

- F. $H_0: p_1 = p_2$
  $H_1: p_1 < p_2$

Identify the critical region. Select the correct choice below and fill in the answer box(es) to complete your choice.
(Round to two decimal places as needed.)

- ★ A. $z > $ 2.33

- B. $z < $ ☐ or $z > $ ☐

- C. $z < $ ☐

Find the test statistic.

1.76 (Round to two decimal places as needed.)

What is the appropriate conclusion for this test?

- ★ A. Do not reject H_0 and conclude that there is not sufficient evidence that a higher proportion of Italians than Americans prefer white champagne at weddings.

- B. Reject H_0 and conclude that there is not sufficient evidence that a higher proportion of Italians than Americans prefer white champagne at weddings.

At a certain college, it is estimated that at most 32% of the students ride bicycles to class. Does this seem to be a valid estimate if, in a random sample of 81 college students, 32 are found to ride bicycles to class? Use a 0.05 level of significance.

A. $H_0: p < 0.32$
$H_1: p = 0.32$

B. $H_0: p > 0.32$
$H_1: p = 0.32$

C. $H_0: p = 0.32$
$H_1: p > 0.32$

D. $H_0: p = 0.32$
$H_1: p \neq 0.32$

E. $H_0: p = 0.32$
$H_1: p < 0.32$

F. $H_0: p \neq 0.32$
$H_1: p = 0.32$

Identify the critical region. Select the correct choice below and fill in the answer box(es) to complete your choice.
(Round to two decimal places as needed.)
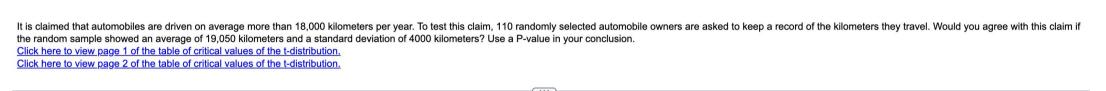
A. $z >$ 1.64

B. $z <$ ▢

C. $z <$ ▢ or $z >$ ▢

Find the test statistic.

$z =$ 1.45 (Round to two decimal places as needed.)

What is the appropriate conclusion for this test?

A. Reject H_0 and conclude that there is sufficient evidence that more than 32% of the students ride bicycles to class. Thus, there is sufficient evidence to reject the estimate that at most 32% of the students ride bicycles to class.

B. Do not reject H_0 and conclude that there is sufficient evidence that more than 32% of the students ride bicycles to class. Thus, there is not sufficient evidence to reject the estimate that at most 32% of the students ride bicycles to class.

C. Do not reject H_0 and conclude that there is not sufficient evidence that more than 32% of the students ride bicycles to class. Thus, there is not sufficient evidence to reject the estimate that at most 32% of the students ride bicycles to

It is claimed that automobiles are driven on average more than 18,000 kilometers per year. To test this claim, 110 randomly selected automobile owners are asked to keep a record of the kilometers they travel. Would you agree with this claim if the random sample showed an average of 19,050 kilometers and a standard deviation of 4000 kilometers? Use a P-value in your conclusion.

Click here to view page 1 of the table of critical values of the t-distribution.
Click here to view page 2 of the table of critical values of the t-distribution.

Identify the null and alternative hypotheses.

○ A. $H_0: \mu \neq 18,000$
      $H_1: \mu = 18,000$

○ B. $H_0: \mu < 18,000$
      $H_1: \mu = 18,000$

○ C. $H_0: \mu = 18,000$
      $H_1: \mu \neq 18,000$

○ D. $H_0: \mu = 18,000$
      $H_1: \mu < 18,000$

○ E. $H_0: \mu > 18,000$
      $H_1: \mu = 18,000$

⭐ F. $H_0: \mu = 18,000$
      $H_1: \mu > 18,000$

Find the test statistic.

2.75 (Round to two decimal places as needed.)

Determine the range into which the P-value falls.

$0.0025 \leq$ P-value < 0.005

What is the appropriate conclusion for this test?

Reject H_0 and conclude that there is sufficient evidence to agree with the claim that automobiles are driven on average more than 18,000 kilometers per year. In general, H_0 would be rejected for significance levels greater than the P-value.