

Stats /

Constructing a confidence interval to test a claim about the population...

A chain of hamburger restaurants claims that the population mean of the wait times in their drive-thru for all customers is 5.71 minutes. You work for a competitor and you want to test that claim. To do so, you select a random sample of 40 of the chain's drive-thru customers and record the wait time in the drive-thru for each. Assume it is known that the population standard deviation of the wait times in the drive-thru for the hamburger chain's restaurants is 2.91 minutes.

Based on your sample, follow the steps below to construct a 95% confidence interval for the population mean of the wait times in the drive-thru for all customers. Then state whether the confidence interval you construct contradicts the restaurant chain's claim. (If necessary, consult a [list of formulas](#).)

- (a) Click on "Take Sample" to see the results from your random sample of 40 customers.

Take Sample

Number of customers	Sample mean	Sample standard deviation	Population standard deviation
40	4.23	2.43	2.91

Enter the values of the sample size, the point estimate for the population mean, the population standard deviation, and the critical value you need for your 95% confidence interval. (Choose the correct critical value from the table of critical values provided.) When you are done, select "Compute".

Sample size: 40

Point estimate: 4.23

Population standard deviation: 2.91

Critical value: 1.96

Compute

Standard error: 0.46

Margin of error: 0.90

95% confidence interval: 4.23 ± 0.90

Critical values

$z_{0.005} = 2.576$
$z_{0.010} = 2.326$
$z_{0.025} = 1.960$
$z_{0.050} = 1.645$
$z_{0.100} = 1.282$

Handwritten notes:

0.95 on inside
0.05 on outside
0.025 on each side

Critical value

$\frac{1 - CL}{2} = \frac{1 - 0.95}{2} = \frac{0.05}{2} = 0.025$

Population standard deviation: 2.91

Critical value: 1.96

Compute

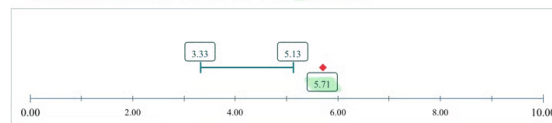
Margin of error: 0.90

95% confidence interval: 4.23 ± 0.90

Critical values

$z_{0.005} = 2.576$
$z_{0.010} = 2.326$
$z_{0.025} = 1.960$
$z_{0.050} = 1.645$
$z_{0.100} = 1.282$

- (b) Based on your sample, graph the 95% confidence interval for the population mean of the wait times in the drive-thru for all customers.
- Enter the lower and upper limits on the graph to show your confidence interval.
 - For the point (•), enter the restaurant chain's claim of 5.71 minutes.



- (c) Does the 95% confidence interval you constructed contradict the restaurant chain's claim? Choose the best answer from the options below.
- ☐ No, the confidence interval does not contradict the claim. The restaurant chain's claim of 5.71 minutes is inside the 95% confidence interval.
- ☐ No, the confidence interval does not contradict the claim. The restaurant chain's claim of 5.71 minutes is outside the 95% confidence interval.
- ☐ Yes, the confidence interval contradicts the claim. The restaurant chain's claim of 5.71 minutes is inside the 95% confidence interval.
- ☒ Yes, the confidence interval contradicts the claim. The restaurant chain's claim of 5.71 minutes is outside the 95% confidence interval.

doesn't fall in the interval