https://studylib.net/doc/18213846/suppose-we-want-to-estimate-the-average-weight-of-an-adul...

https://www.scribd.com/document/448327533/Basic-Statisticks-1-Assignment-Vivek-T

Suppose we want to estimate the average weight of a

n adult male in Dekalb County,

Georgia. We draw a random sample of 1,000 men from

a population of 1,000,000 men

and weigh them. We find that the average man in our

sample weighs 180 pounds, and the

standard deviation of the sample is 30 pounds. What

is the 95% confidence interval.

Solution

To specify the confidence interval, we work through th

e four steps below.

Identify a sample statistic. Since we are trying to e

stimate the mean weight in the

population, we choose the mean weight in our sample

(180) as the sample statistic.

Select a confidence level. In this case, the confidence l

evel is defined for us in the

problem. We are working with a 95% confidence level.

Find the margin of error. The key steps are shown b

elow.

•

Find standard error. The standard error (SE) of the

mean is:

SE

s

n

= =

= =

30

1000

30

3162

095

.

.

•

Find critical value. The critical value is a factor used

to compute the margin of

error. To express the critical value as a

t score

(t\*), follow these steps.

o

Compute alpha (α): α = 1 . (confidence level / 100) =

0.05

o

Find the critical probability (p\*): p\* = 1 . α/2 = 1

. 0.05/2 = 0.975

o

Find the

degrees of freedom

(df): df = n . 1 = 1000 . 1 = 999

o

The critical value is the t score having 999 degrees o

f freedom and a

probability

equal to 0.975. From the

t

chart

,

we find that the critical

value is 1.96.

Note: We might also have expressed the critical value

as a

z score.

Because the

sample size is large, a z score analysis produces the

same result . a critical

value equal to 1.96.

•

Compute margin of error (ME): ME = critical value \* s

tandard error = 1.96 \* 0.95

= 1.86

Specify the confidence interval. The range of the confi

dence interval is defined by the

sample statistic

+

margin of error

. And the uncertainty is denoted by the confidence

level. Therefore, we can be 95% confident that the po

pulation mean falls within the

interval 180 +

1.86.

<https://brainly.com/question/20534182>

Using the **t-distribution**, it is found that:

* The **94%** confidence interval is **(198.73, 201.27).**
* The **96%** confidence interval is **(198.61, 201.39).**
* The **98%** confidence interval is **(198.43, 201.57).**

We are given the standard deviation for the sample, which is why the **t-distribution** is used to solve this question.

The **information given** is:

* Sample **mean**of .
* Sample **standard deviation** of .
* Sample **size**of .

The **interval** is:



* In which **t** is the critical value for the two-tailed confidence interval.

Considering a **94%** confidence level, using a calculator, with 200 - 1 = **199 df**, the critical value is **t = 1.8916**, hence:





The **94%** confidence interval is **(198.73, 201.27).**

Considering a **96%** confidence level, using a calculator, with 200 - 1 = **199 df**, the critical value is **t = 2.0673**, hence:





The **96%** confidence interval is **(198.61, 201.39).**

Considering a **98%** confidence level, using a calculator, with 200 - 1 = **199 df**, the critical value is **t = 2.3452**, hence:





The **98%** confidence interval is **(198.43, 201.57).**

You can learn more about the use of the **t-distribution**to build a confidence interval at [brainly.com/question/16162795](https://brainly.com/question/16162795)

**Answer:**

1.- CI = 94% (  μ₀ -  1,04   <  x   <   μ₀ +  1,04 )

2.- CI = 98 % ( μ₀ - 2,05  <  x   <   μ₀ + 2,05 )

3.- CI = 96 %  (  μ₀ - 1,75  <  x   <   μ₀  + 1,75 )

**Step-by-step explanation:**

**Sample size      n  = 3000000**

**Sample mean   x  =  200**

**Standard deviation   s  =  30**

**From  z-table values of z(c):**

**CI  94 %        Confidencial level   α = 6 %   α = 0,06   z(c) = 1,55**

**CI  98 %        Confidencial level   α = 2 %   α = 0,02   z(c) = 2,05**

**CI  96 %        Confidencial level   α = 4 %   α = 0,04   z(c) =  1,75**

MOE = z(c) \* σ/√n

1.-MOE =  1,55\* 30 / √2000    MOE = 1,04

2.-MOE = 2,05\*30/√2000      MOE = 1,38

3.-MOE = 1,75\*30/√2000        MOE = 1,17

Then CI

1.-  CI = 94 %     (  μ₀ -  MOE <  x  <   μ₀ -  MOE )

     CI  =  (  μ₀ -  1,04   <  x   <   μ₀ +  1,04 )

2.-CI = 98 %

     CI  = (    μ₀ - 2,05  <  x   <   μ₀ + 2,05 )

3.- CI = 96 %

     CI = (  μ₀ - 1,75  <  x   <   μ₀  + 1,75 )