ASSIGNMENT 4

CCS226-18

MARASIGAN, VEM AIENSI A.

2BSCS-1

1. THE LENGTHS OF REPEATERS TO MAKE THE INTERNET STRONGER AT A COMPUTER STORE ARE NORMALLY DISTRIBUTED WITH MEAN 3.4 METERS AND A STANDARD DEVIATION OF 0.80 METER. A DOZEN REPEATERS WERE PURCHASED BY A SCHOOL AND THEIR LENGTHS WERE MEASURED.

Given:

$\mu = 3.4$ m $s = 0.8$ m $n = 12$ repeaters $df = 11$

- Since sample size is less than 30, T-Distribution will be used.

A) WHAT IS THE PROBABILITY THAT THE SAMPLE MEAN LENGTH OF THE 12 BOUGHT REPEATERS WILL BE LESS THAN 3.00 METERS?

Given:

$\bar{x} = 3$ m

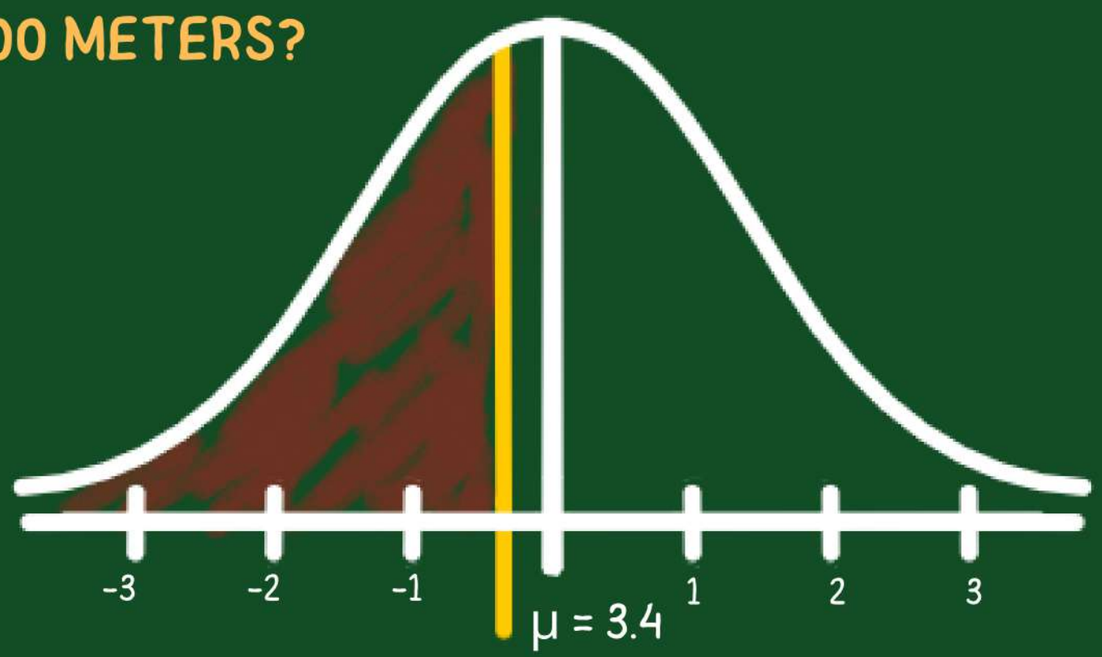
$P(T < t) = ?$

Getting the t score:

$$t = \frac{\bar{x} - \mu}{s / \sqrt{n}}$$

$$t = \frac{3 - 3.4}{0.8/\sqrt{12}}$$

$t = -0.1443$



$\bar{x} = 3$
$t = -0.1443$

$P(T < -0.14) =$ **0.4439**

Based on T-Distribution Calculator.

Getting the P-value:

Based on T-Distribution Table

$P(T < -0.14) = 0.5 > Area > 0.25$

Based on T-Distribution Calculator

$P(T < -0.14) =$ **0.4439**

There is 44.39% chance that 12 repeaters are less than 3 meters.

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Given:

μ = 3.4 m s = 0.8 m n = 12 repeaters df = 11

- Since sample size is less than 30, T-Distribution will be used.

B) WHAT IS THE PROBABILITY THAT THE SAMPLE MEAN LENGTH WILL BE MORE THAN 3.20 METERS?

Given:

$\bar{x}$ = 3.2 m

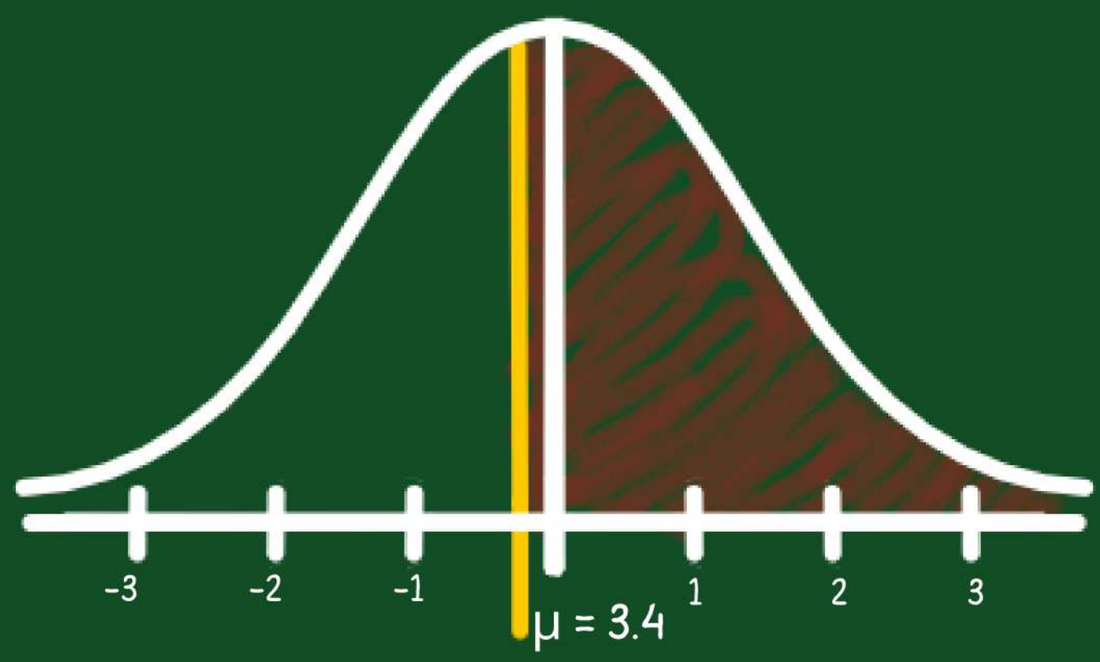
P(T › t) = ?

Getting the t score:

$$t = \frac{\bar{x} - \mu}{s / \sqrt{n}}$$

$$t = \frac{3.2 - 3.4}{0.8/\sqrt{12}}$$

t = - 0.0721



$\bar{x}$ = 3.2
t = -0.0721

P(T › -0.07) = **0.5281**

Getting the P-value:

Based on T-Distribution Table

P(T ‹ -0.07) = 0.5 › Area › 0.25

Based on T-Distribution Calculator

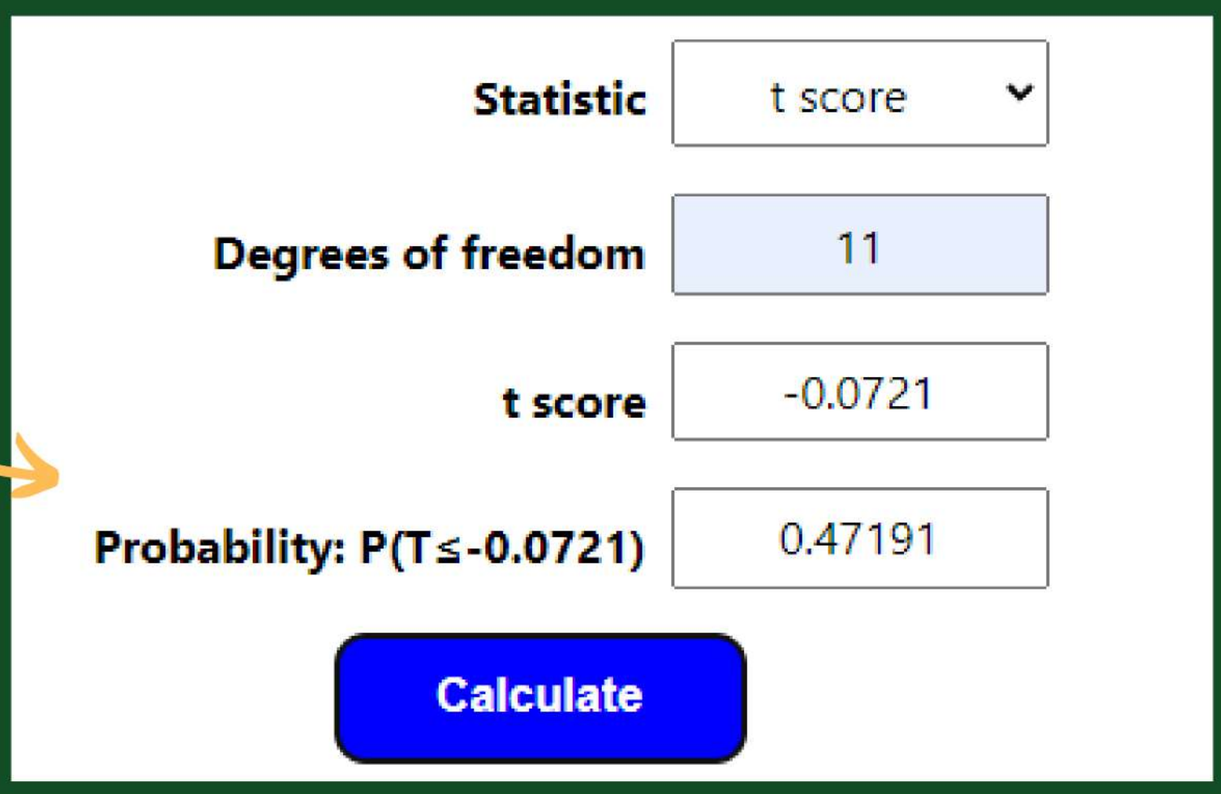
P(T ‹ -0.07) = 0.4719

Since we are getting greater than -0.07:

P(T › -0.07) = 1 - P(T ‹ -0.07)

= 1 - 4719

P(T › -0.07) = 0.5281



There is 52.81% chance that 12 repeaters are greater than 3.2 meters.

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Given:

μ = 3.4 m s = 0.8 m n = 12 repeaters df = 11

- Since sample size is less than 30, T-Distribution will be used.

C) WHAT IS THE PROBABILITY THAT THE SAMPLE MEAN LENGTH WILL BE BETWEEN 3.00 AND 3.20 METERS?

Given:

$\bar{x}_1 = 3$ m

$t_1 = -0.14$

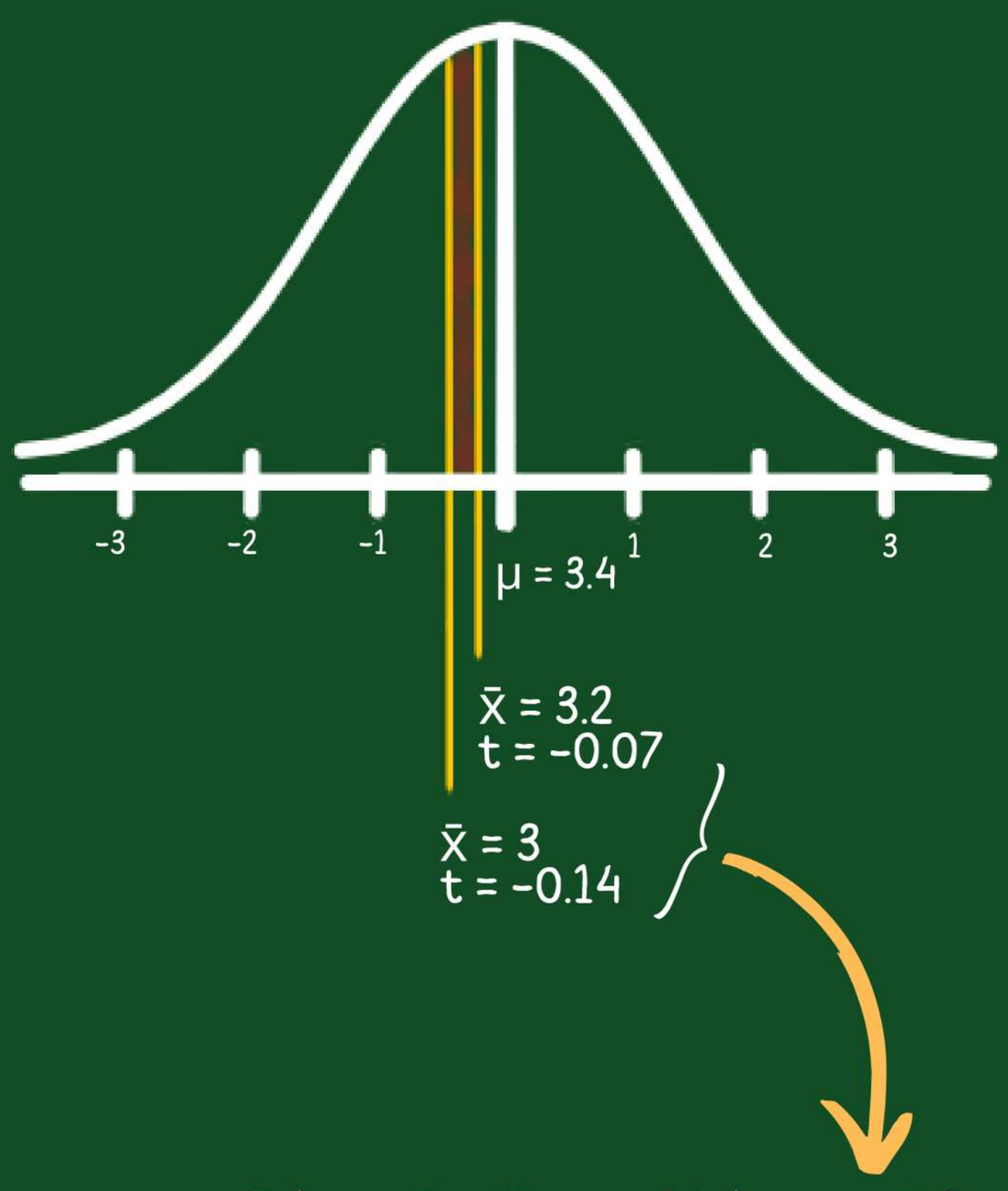
$P(T < -0.14) = 0.4439$

$\bar{x}_2 = 3.2$ m

$t_2 = -0.07$

$P(T < -0.07) = 0.4719$

$P(t_2 > T > t_1) = ?$



Getting the P-value:

Based on previous Calculations

$P(T < -0.14) =$ **0.4439**

$P(T < -0.07) =$ **0.4719**

$P(-0.07 > T > -0.14) = 0.4719 - 0.4439$

$P(-0.07 > T > -0.14) = 0.028$

$P(-0.07 > T > -0.14) =$ **0.028**

There is 2.8% chance that 12 repeaters are between 3 and 3.2 meters.

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Given:

μ = 3.4 m s = 0.8 m n = 12 repeaters df = 11

- Since sample size is less than 30, T-Distribution will be used.

D) WHAT IS THE PROBABILITY THAT THE SAMPLE MEAN LENGTH WILL BE MORE THAN 3.80 METERS?

Given:

$\bar{x}$ = 3.8 m

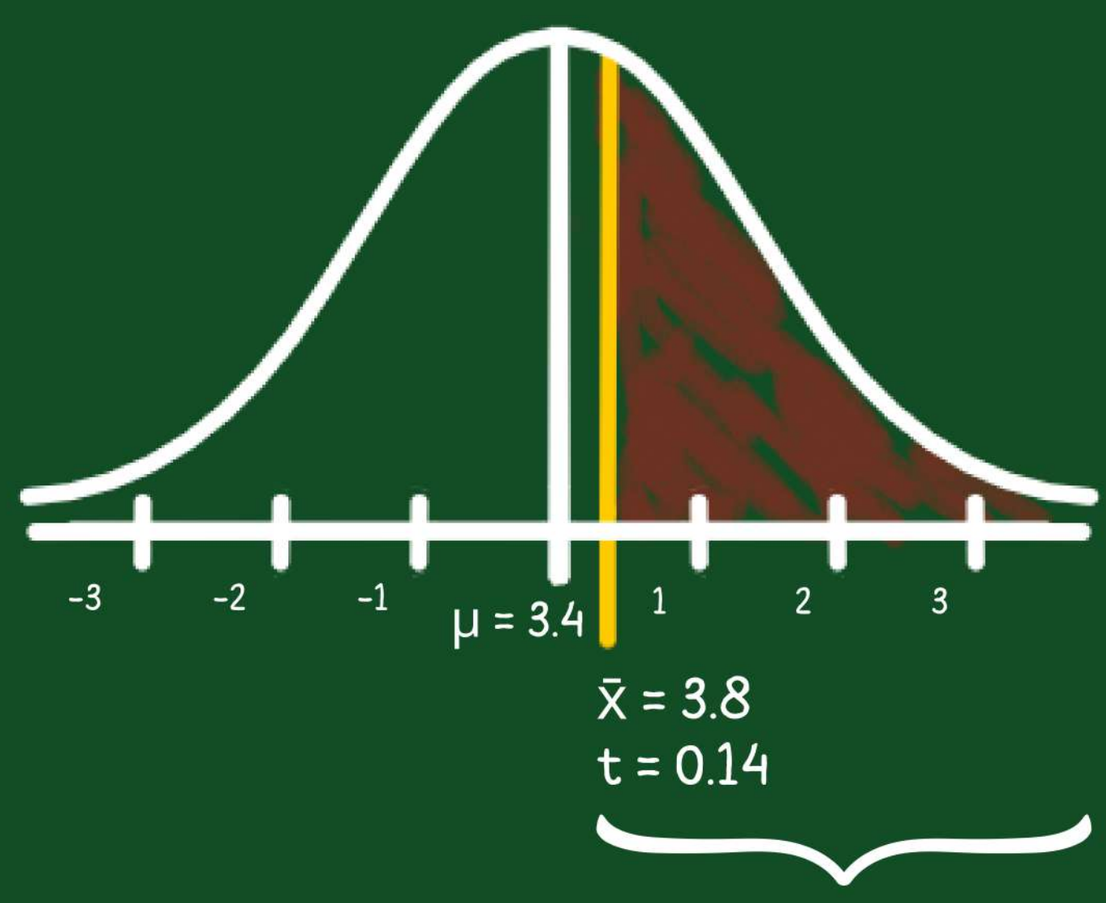
P(T › t) = ?

Getting the t score:

$$t = \frac{\bar{x} - \mu}{s / \sqrt{n}}$$

$$t = \frac{3.8 - 3.4}{0.8/\sqrt{12}}$$

t = 0.1443



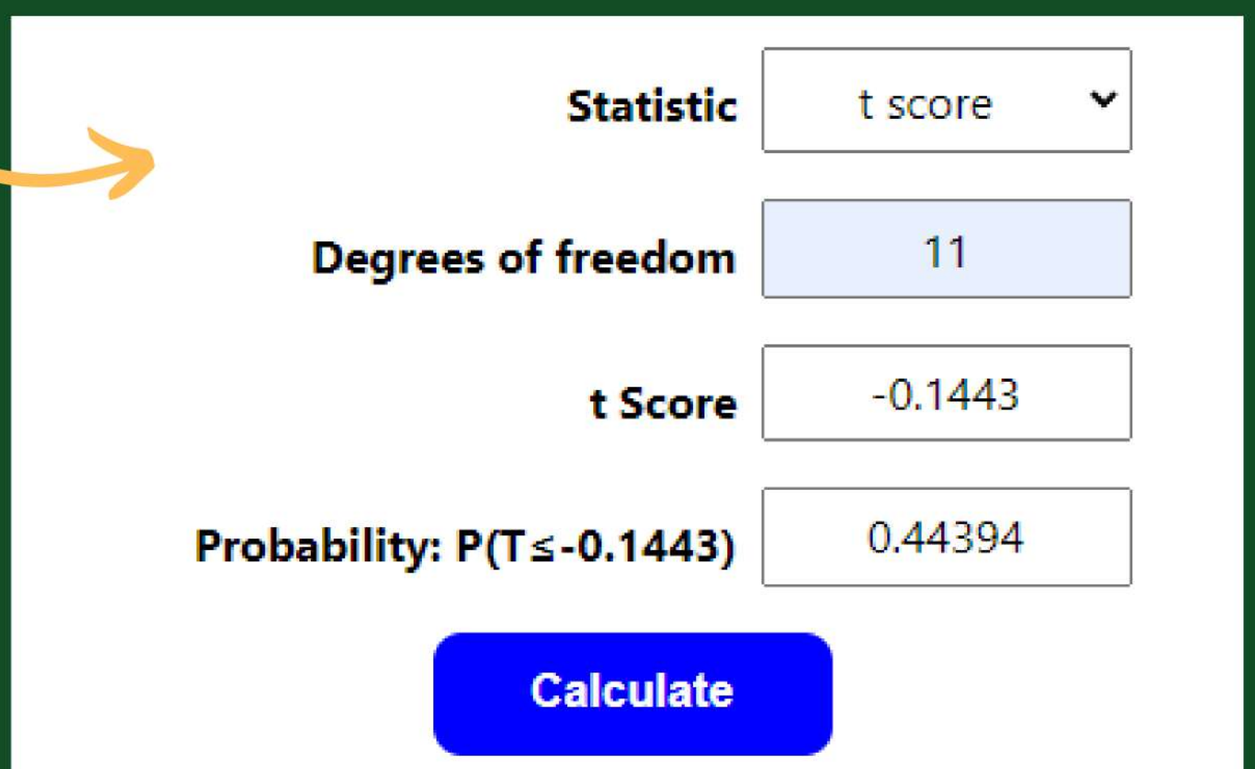
P(T › 0.14) = **0.4439**

Getting the P-value:

- Knowing that P(T ‹ -0.14) = 0.4439 from previous calculation, we can simply get the value because;
- P(T ‹ -0.14) is equal to P(T › 0.14)

Therefore;

P(T › 0.14) = 0.4439



There is 44.39% chance that 12 repeaters are more than 3.8 meters.