

Chapter 14 / Example 7

The t -test

- a** In order to test the hypotheses $H_0: \mu = 8.2$, $H_1: \mu < 8.2$ a sample of 14 is taken and the mean of the sample is found to be 8.15 and the standard deviation 0.07. Test at the 5% significance level whether the sample is from the population given or one with a smaller mean.
- b** The sample below is thought to have come from a normal population with a mean of 34.5. Test this belief at a 5% significance level.

34.3	30.2	29.7	34.4	33.6	35.7	34.0	33.9	35.1	34.5
------	------	------	------	------	------	------	------	------	------

Calculate $s_{n-1} = \sqrt{\frac{n}{n-1}} s_n = \sqrt{\frac{14}{13}} \cdot 0.07 = 0.0726$ and store this value as A by pressing $\boxed{\text{STO}} \boxed{\rightarrow} \boxed{\text{ALPHA}} \boxed{\text{A}}$. Press $\boxed{\text{ENTER}}$.

```

 $\sqrt{\frac{14}{13}} * 0.07 \rightarrow A$ 
.....072642433
  
```

$H_0: \mu = 8.2$, $H_1: \mu < 8.2$

To calculate the p -value press $\boxed{\text{STAT}}$ and $\boxed{\rightarrow} \boxed{\rightarrow}$ to access the TESTS menu.

Select 2:T-Test... and press $\boxed{\text{ENTER}}$.

```

T-Test
Inpt:Data Stats
 $\mu_0$ :0
List:L1
Freq:1
 $\mu$ : $\neq \mu_0$  < $\mu_0$  > $\mu_0$ 
Color: BLUE
Calculate Draw
  
```

Choose Input: Stats

$\mu_0 = 8.2$

$\bar{x} = 8.15$

$Sx = A$

$n = 14$

$\mu < \mu_0$

Navigate down to Calculate and press $\boxed{\text{ENTER}}$.

```

T-Test
Inpt:Data Stats
 $\mu_0$ :8.2
 $\bar{x}$ :8.15
Sx: .07264243303278
n:14
 $\mu$ : $\neq \mu_0$  < $\mu_0$  > $\mu_0$ 
Color: BLUE
Calculate Draw
  
```

p -value = 0.0115 < 0.05, significant so reject $H_0: \mu = 8.2$

```

T-Test
 $\mu$ <8.2
t=-2.575393768
p=.0115284968
 $\bar{x}$ =8.15
Sx=.072642433
n=14
  
```

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The t -test

Press **[STAT]** 1:Edit and press **[ENTER]**

Type the values in the first column.

Press **[ENTER]** or \uparrow after each number to move to the next cell.

L1	L2	L3	L4	L5	1
34.3					
30.2					
29.7					
34.4					
33.6					
35.7					
34					
33.9					
35.1					
34.5					

L1(11)=					

$H_0: \mu = 34.5$, $H_1: \mu \neq 34.5$

To calculate the p -value Press **[STAT]** and **[▶▶]** to access the TESTS menu.

Select 2:T-Test... and press **[ENTER]**.

```

T-Test
Inpt:Data Stats
 $\mu_0$ :8.2
 $\bar{x}$ :8.15
Sx:.07264243303278
n:14
 $\mu$ : $\neq\mu_0$   $<\mu_0$   $>\mu_0$ 
Color: BLUE
Calculate Draw
  
```

Choose Input: Data

$\mu_0 = 34.5$

List: L1

Freq: 1

$\mu \neq \mu_0$

Navigate down to Calculate and press **[ENTER]**.

```

T-Test
Inpt:Data Stats
 $\mu_0$ :34.5
List:L1
Freq:1
 $\mu$ : $\neq\mu_0$   $<\mu_0$   $>\mu_0$ 
Color: BLUE
Calculate Draw
  
```

p -value = 0.161 > 0.05, not significant so insufficient evidence to reject H_0

```

T-Test
 $\mu \neq 34.5$ 
t=-1.526740073
P=.1611708
 $\bar{x}$ =33.54
Sx=1.988410867
n=10
  
```