

one-sample t-test: Task - 4

used for comparison of sample mean of data to particularly given value.

\* we can use for sample size is small  
\* sample size  $< 30$ .

$H_0: \mu = 5$  (null hypothesis)

$H_1: \mu > 5$  (alternative hypothesis)

Sample data = 6.2, 4.8, 5.5, 7.0, 6.8, 5.9, 4.7, 6.1, 5.6, 6.4

$n = 10$

$$\bar{x} = \frac{59}{10} = 5.9$$

$$s = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n-1}}$$

$$t = \frac{\bar{x} - \mu_0}{s / \sqrt{n}}$$

$x_i$	$x_i - \bar{x}$	$(x_i - \bar{x})^2$
6.2	0.3	0.09
4.8	-1.1	1.21
5.5	-0.4	0.16
7.0	1.1	1.21
6.8	0.5	0.25
5.9	0.0	0.0
4.7	-1.2	1.44
6.1	0.2	0.04
5.6	-0.3	0.09
6.4	0.5	0.25
		$\Sigma(x_i - \bar{x})^2 = 5.50$

$$s = \sqrt{\frac{5.50}{9}} = \sqrt{0.611} = 0.78$$

$$t = \frac{5.9 - 5}{0.78 / \sqrt{10}}$$

$$= \frac{0.9}{0.247} = 3.64$$

degree of freedom  $= n - 1 = 10 - 1 = 9$   
 $\alpha = 0.05$

$t_{0.05, 9} = 1.833 \rightarrow$  critical value

So,  $3.64 > 1.833$ , we reject  $H_0$ .