$y \sim N(\mu, \sigma^2)$ Yi: 18, 33, 36, 18, 30, 27 عينة غير مصابة

Mean: $\bar{y} = 162/6 = 27$

Variance: $s^2 = 288/5 = 57.6$

Standard Deviation: $s = \sqrt{57.6} = 7.589$

Coefficient of Variation:

$$C.V = (s / \bar{y}) * 100 = 7.589 / 27 * 100 = 28.11\ \%$$

Standard Error: $S.E = s/\sqrt{n} = 7.589/\sqrt{6} = 3.098$

$$y \sim N(\mu, 7.26)$$

$$Ho: \mu = 24$$

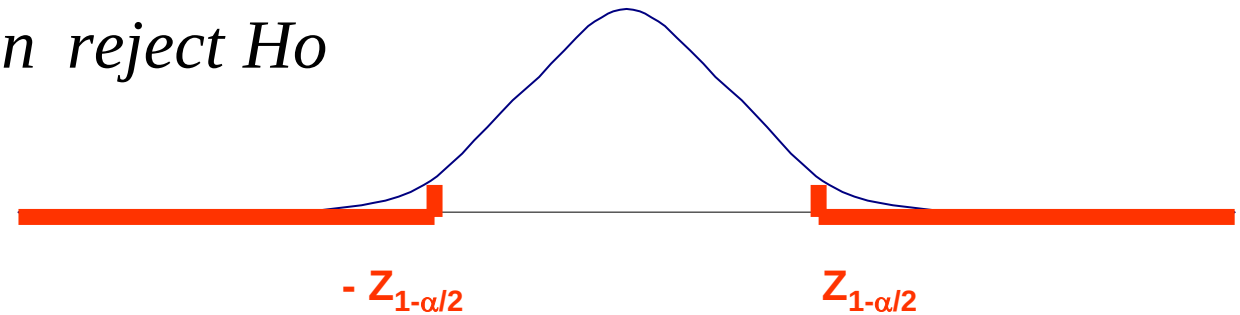
$$Ha: \mu \neq 24$$

$$z = \sqrt{n}(\bar{y} - \mu)/\sigma \sim N(0,1)$$

$$\alpha = 0.05$$

$$Z^* = (\bar{y} - 24)/\sqrt{7.26/6}$$

$$If\ |z^*| > z_{1-\alpha/2}\ \ then\ \ reject\ Ho$$



$$\because\ \ z^* = (27 - 24)/1.1 = 2.727 > 1.96 = z_{0.975}\ \ \therefore reject\ Ho$$

$$y \sim N(\mu, \sigma^2)$$

$$Ho: \mu = 24$$

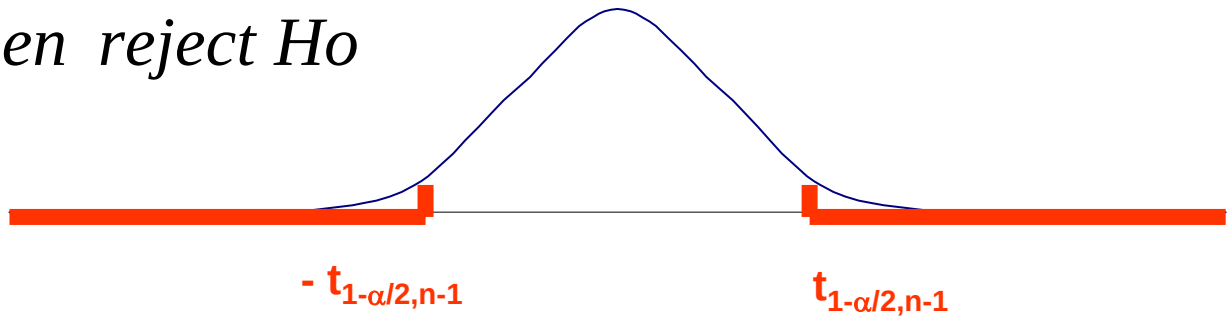
$$Ha: \mu \neq 24$$

$$t = \sqrt{n}(\bar{y} - \mu) / s \sim t(n-1)$$

$$\alpha = 0.05$$

$$t^* = (\bar{y} - 24) / \sqrt{57.6/6}$$

$$If \ |t^*| > t_{(1-\alpha/2, n-1)} \ \ then \ \ reject \ Ho$$



$$\because \ t^* = (27 - 24)/3.098 = 0.968 < 2.571 = t_{0.975,5} \ \ \therefore \ Ho \ can \ not \ be \ rejected$$

$y \sim N(\mu, \sigma^2)$ Yi: 30, 18, 26, 35, 50, 21 $\bar{y} = 30$

$s^2 = 133.2$

$Ho: \mu = 24$

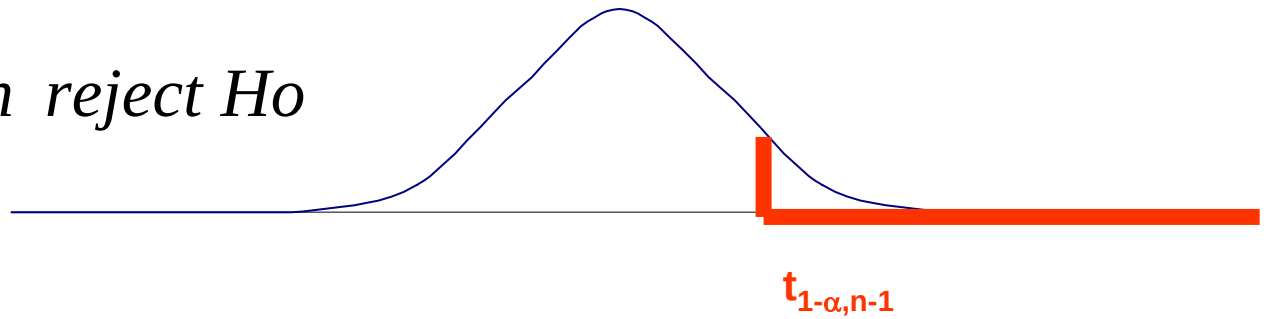
$Ha: \mu > 24$

$$t = \sqrt{n}(\bar{y} - \mu)/s \sim t(n-1)$$

$\alpha = 0.05$

$$t^* = (\bar{y} - 24)/\sqrt{133.2/6}$$

If $t^* > t_{(1-\alpha, n-1)}$ *then reject Ho*



$\because \quad t^* = (30 - 24)/4.712 = 1.273 < 2.015 = t_{0.95,5} \quad \therefore$ *Ho can not be rejected*

$y_1 \sim N(\mu_1, \sigma_1^2)$ Y1i: 18, 33, 36, 18, 30, 27 عينة غير مصابة

$y_2 \sim N(\mu_2, \sigma_2^2)$ Y2i: 30, 18, 26, 35, 50, 21 نباتات مصابة بالفيروس

$\bar{y}_1 = 27$ $\bar{y}_2 = 30$

$s_1^2 = 57.6$ $s_2^2 = 133.2$

$\sigma_1^2 = \sigma_2^2 = \sigma^2$ $s_p^2 = \frac{288+666}{5+5} = 95.4$

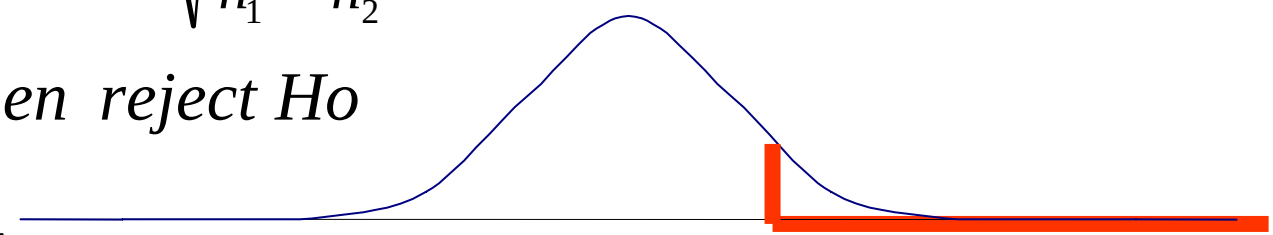
$Ho: \mu_2 = \mu_1$

$Ha: \mu_2 > \mu_1$

$\alpha = 0.05$

$$\frac{(\bar{y}_2 - \bar{y}_1) - (\mu_2 - \mu_1)}{s_p\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \sim t(n_1 + n_2 - 2)$$

If $t^* > t_{(1-\alpha, n_1+n_2-2)}$ *then reject Ho*



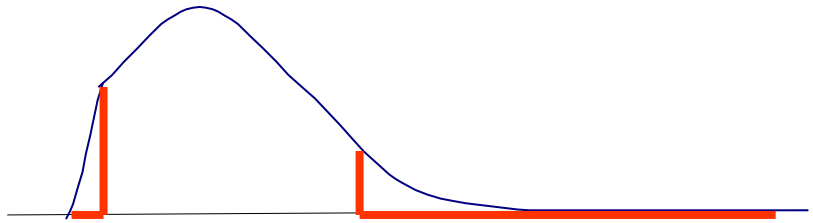
$\because \quad t^* = (30-27)/\sqrt{\frac{190.8}{6}} = 0.532 < 1.812 = t_{0.95,10}$

$\therefore$ *Ho can not be rejected*

$$H_0 : \sigma_1^2 = \sigma_2^2$$

$$H_a : \sigma_1^2 \neq \sigma_2^2$$

$$\mathrm{F} = \frac{s_1^2 / \sigma_1^2}{s_2^2 / \sigma_2^2} \sim F(n_1 - 1, n_2 - 1)$$



$$If\ \mathrm{F}^* = \frac{s_1^2}{s_2^2} > \mathrm{F}^{1\text{-}\alpha/2}_{n1-1,n2-1}\ \mathrm{OR}$$

$$if\ \mathrm{F}^* = \frac{s_1^2}{s_2^2} < 1/\mathrm{F}^{1\text{-}\alpha/2}_{n2-1,n1-1}$$

$$\because \mathrm{F}^* = 133.2/57.6 = 2.312 < 5.05 \therefore \sigma_1^2 = \sigma_2^2$$

If we reject H_0 then d.f is:

$$d.f = \frac{[57.6/6 + 133.2/6]^2}{[92.16/5 + 492.84/5]} = \frac{1011.24}{117} = 8.64$$

$$t^* = (30 - 27) / \sqrt{190.8/6} = 0.532$$

And t(0.95,8) = 1.86

l	y2	y1	d	d^2
1	30	18	12	144
2	18	33	-15	225
3	26	36	-10	100
4	35	18	17	289
5	50	30	20	400
6	21	27	-6	36
Sum			**18**	**1194**

$$\bar{d} = 18 / 6 = 3$$

$$s_d^2 = \frac{1194 - 18^2/6}{5} = 228$$

$$s_{\bar{d}}^2 = \frac{228}{6} = 38$$

$$H_0 : (\mu_2 - \mu_1) = \mu_d = 0$$

$$H_a : \mu_d > 0$$

$$d \sim N(\mu_d, \sigma_d^2)$$

$$\text{Reject } H_0 \text{ if } t^* = \frac{\bar{d}}{s_{\bar{d}}} > t(1-\alpha, n-1)$$

$$\because t^* = 3/\sqrt{38} = 0.487 < 2.015 = t(0.95,5)$$

$$\therefore \mu_1 = \mu_2$$

l	y2	y1	d	d^2
1	30	18	12	144
2	32	33	-1	1
3	26	36	-10	100
4	35	18	17	289
5	30	30	0	0
6	27	27	0	0
Sum			**18**	**534**

$$\bar{d} = 18 / 6 = 3$$

$$s_d^2 = \frac{534 - 18^2/6}{5} = 96$$

$$s_{\bar{d}}^2 = \frac{96}{6} = 16$$

$$H_0 : (\mu_2 - \mu_1) = \mu_d = 0$$

$$H_a : \mu_d > 0$$

$$d \sim N(\mu_d, \sigma_d^2)$$

$$\text{Reject } H_0 \text{ if } t^* = \frac{\bar{d}}{s_{\bar{d}}} > t(1-\alpha, n-1)$$

$$\because t^* = 3/4 = 0.75 < 2.015 = t(0.95,5)$$

$$\therefore \mu_1 = \mu_2$$

i	T1	T2	T3	T4	T5	
1	7	13	20	9	18	
2	9	15	22	14	16	
3	20	16	21	21	17	
4	19	14	27	22	14	
5	11	23	23	8	22	
6	6	22	15	10	10	
7	12	16	19	7	15	
Sum	**84**	**119**	**147**	**91**	**112**	**$Y_{..} = 553$**
	$Y_{.1}$	**$Y_{.2}$**	**$Y_{.3}$**	**$Y_{.4}$**	**$Y_{.5}$**	
	7056	**14161**	**21609**	**8281**	**12544**	**$\Sigma Y^2_{.j}/7 = 9093$**

Mean

	12	**17**	**21**	**13**	**16**	**15.8**
i	T1	T2	T3	T4	T5	
1	49	169	400	81	324	
2	81	225	484	196	256	
3	400	256	441	441	289	
4	361	196	729	484	196	
5	121	529	529	64	484	
6	36	484	225	100	100	
7	144	256	361	49	225	

$\Sigma y^2_{ij} =$ **9765**

S.O.V	d.f	SS	MS	F
Between	4	355.6	88.9	3.969
Within	30	672.0	22.4	
Total	34	1027.6		