① We have the potato yield from 12 different farms. The standard ~~dev~~ potato yield for the given variety is $\mu = 20$

$x = [21.5, 24.5, 18.5, 17.2, 14.5, 23.2, 22.1, 20.5, 19.4, 18.1, 24.1, 18.5]$

Ans:- Here $H_0 \rightarrow \mu \leq 20$

$H_1 \rightarrow \mu > 20$

It is a 2 tailed test

Take $\alpha = 5\%$

$$T = \frac{\bar{x} - \mu}{\frac{\sigma_{pop}}{\sqrt{n}}}$$

$$= \frac{20.175 - 20}{\frac{\sigma_{pop}}{\sqrt{n}}}$$

$$\bar{x} = \frac{21.5 + 24.5 + 18.5 + 17.2 + 14.5 + 23.2 + 22.1 + 20.5 + 19.4 + 18.1 + 24.1 + 18.5}{12}$$

$$= \frac{242.1}{12} = 20.175$$

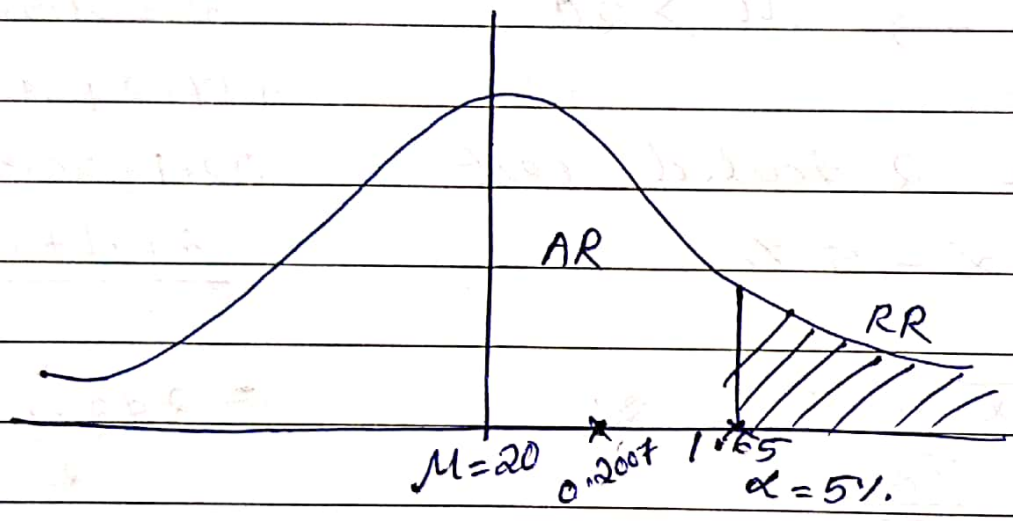
$$\sigma = \sqrt{\frac{\sum_{i=1}^{n} (x_i - \bar{x})^2}{n-1}}$$

$$= \sqrt{\frac{(21.5 - 20.175)^2 + (24.5 - 20.175)^2 + \cdots + (18.5 - 20.175)^2}{12 - 1}}$$

$\sigma_{rep} = 3.0211$

$$T = \frac{20.175 - 20}{\frac{3.0211}{\sqrt{12}}} = \frac{0.175}{\frac{3.0211}{3.46}}$$

$$= \frac{0.175 \times 3.46}{3.0211} = \frac{0.606}{3.0211} = 0.2007$$



Acceptance region = 95%.

0.95 in t table = 1.65

So $T_{critical} = 1.65$

$T_{calculated} = 0.2007$ it lies in the acceptance region. So Accept H_0.