

## Exemplo de aplicação

Pg 21

$$\begin{aligned}
 b) \quad & \left\{ \begin{aligned} \bar{x}_B &= 7,1 \\ s_B &= 2,1 \\ n_A &= 50 \end{aligned} \right. \\
 & \left\{ \begin{aligned} \bar{x}_A &= 6,8 \\ s_A &= 2,8 \\ n_A &= 120 \end{aligned} \right.
 \end{aligned}$$

$$H_0: \mu_A - \mu_B \geq 0$$

$$H_1: \mu_A - \mu_B < 0$$

Método

 $\bar{X}_A$  - "ph médio de 120 grammas A"

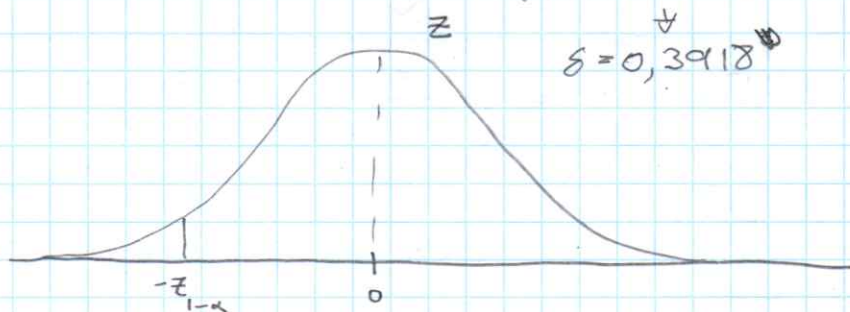
 $\bar{X}_B$  - "ph " 50 B"

$$\bar{X}_A = \frac{\sum_{i=1}^{120} X_{Ai}}{120} \underset{\substack{\text{TLC} \\ n=30}}{\sim} N\left(\mu_A, \frac{s_A^2}{120}\right) \quad s_A^2 = 7,30, n=30$$

$$\bar{X}_B = \frac{\sum_{i=1}^{50} X_{Bi}}{50} \underset{\substack{\text{TLC} \\ n=30}}{\sim} N\left(\mu_B, \frac{s_B^2}{50}\right)$$

$$\bar{X}_A - \bar{X}_B \sim N\left(\mu_A - \mu_B; \left(\frac{s_A^2}{120} + \frac{s_B^2}{50}\right)\right)$$

③



$$\alpha = 0,05 \Rightarrow z_{1-\alpha} = \Phi^{-1}(1-\alpha) = \Phi^{-1}(0,95) = 1,645$$

$$RC_z = ]-\infty, -1,645]$$

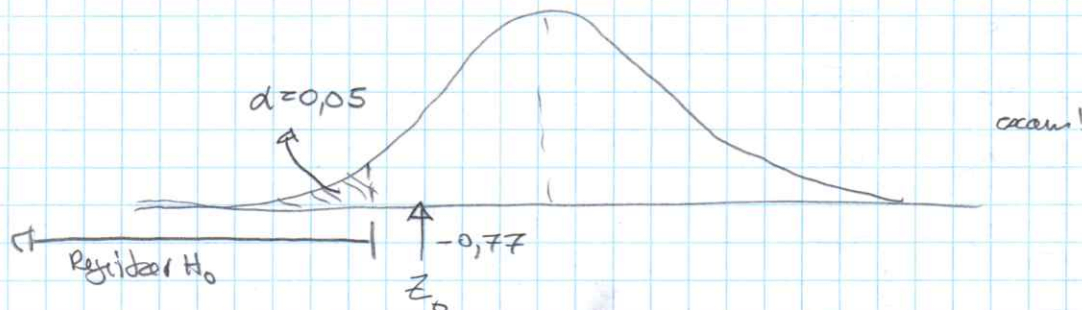
④

Decisão

$$Z_{obs} = \frac{\bar{X}_A - \bar{X}_B - \phi}{\sqrt{\frac{\sigma_A^2}{n_A} + \frac{\sigma_B^2}{n_B}}}$$

normalize.

$$= \frac{6,8 - 7,1}{0,3918} = -0,77$$



Resposta: como  $Z_{obs} \notin RC_Z$   $H_0$  não deve ser rejeitada  
logo não se pode afirmar que as águas seguem níveis críticos, considerando  $\alpha = 0,05$ .

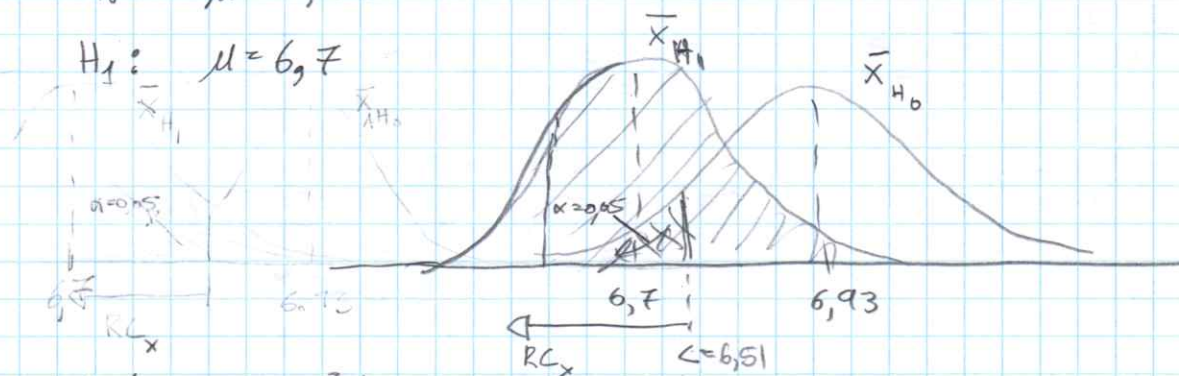
" $\alpha \approx 5\%$  por defeito"

$$c) \beta = \text{Prob (Aceitar } H_0 \mid H_0 \text{ é Falso)}$$

"fazer parte do trabalho"

$$H_0: \mu = 6,93$$

$$H_1: \mu = 6,7$$



$$\text{sub } X_{AH_0} \sim N(6,93; \frac{2,8^2}{120})$$

$$\text{sub } X_{BH_0} \sim N(6,7; \frac{2,8^2}{120})$$

$$P(X_{H_0} < C) = 0,05$$

$$\Phi\left(\frac{C - 6,93}{\frac{2,8}{\sqrt{120}}}\right) = 0,05$$

$$\frac{C - 6,93}{\frac{2,8}{\sqrt{120}}} = \Phi^{-1}(0,05) = -1,645$$



$$\begin{aligned}
 \beta &= P(\bar{X}_{H_1} > 6,51) \\
 &= 1 - P(\bar{X}_{H_1} \leq 6,51) \\
 &= 1 - \Phi\left(\frac{6,51 - 6,7}{2,8/\sqrt{20}}\right) \\
 &= 1 - \Phi(-0,74) \\
 &= \Phi(0,74) = 77\%
 \end{aligned}$$

$$\beta = \text{Prob}(\text{Aceita } H_0 \mid H_0 \text{ é Falsa})$$

$$1 - \beta = \text{Prob}(\text{Rejeita } H_0 \mid H_0 \text{ é Falsa})$$

Potência do teste

$$1 - \beta = 23\%$$

Quilodado sei teste!