p-value.

4. In a certain chemical process, it is very important that a particular solution that is to be used as a reactant have a pH of exactly $\boxed{8.20}$. A method for determining pH that is available for solutions of this type is known to give measurements that are normally distributed with a mean equal to the actual pH and with a standard deviation of $\boxed{.02}$. Suppose 10 independent measurements yielded the following pH values:

8.18	8.17
8.16	8.15
8.17	8.21
8.22	8.16
8.19	8.18

Es cierto que el promedio de los datos vienen de la distribución grande

- Debe calcular el p-value

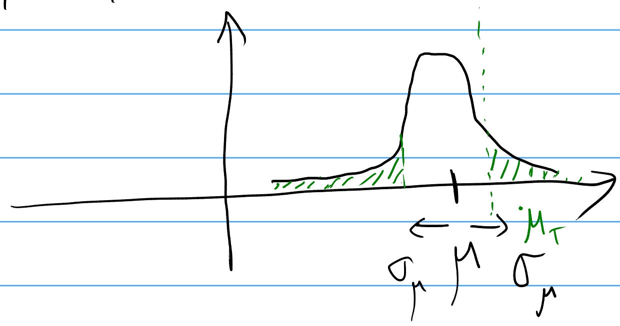
- Se debe tomar la desición con un nivel de significancia de 0.05.

$$\overleftrightarrow{\quad 100 \quad}$$

165 cm [170, 185, 161, ...]

$\mu = 163.5$

$\sigma_\mu = 2.0$



p-value > significancia

Tomo la desición de que $\mu = \mu_T$

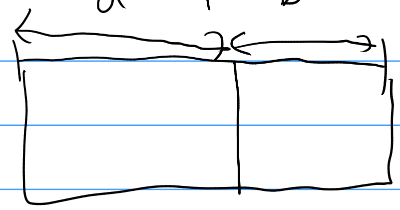
σ^2 varianza

σ std

$$Z = X + Y \qquad \mu_x, \mu_y, \sigma_x, \sigma_y$$

$$\sigma_{x+y}^2 = \sigma_x^2 + \sigma_y^2 \qquad \mu_{x+y} = \mu_x + \mu_y$$

$$\sigma_{x+y}^2 = \frac{\sum\left((x_i + y_i) - \mu\right)^2}{N}$$



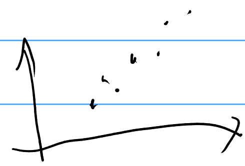
$$\sigma_{x+y}^2 = \frac{\sum\left((x_i + y_i) - \mu_x - \mu_y\right)^2}{N}$$

$$= \frac{\sum\left((x_i - \mu_x) + (y_i - \mu_y)\right)^2}{N}$$

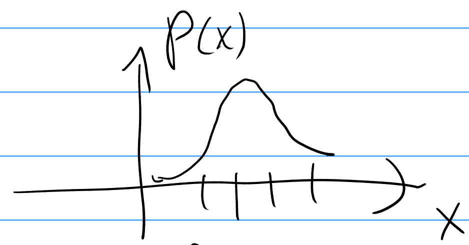
$$= \frac{\sum (x_i - \mu_x)^2}{N} + \frac{\sum (y_i - \mu_y)^2}{N} + \frac{2\sum (x_i - \mu_x)(y_i - \mu_y)}{N}$$

$$= \sigma_x^2 + \sigma_y^2 + 2\,\mathrm{cov}(x, y)$$

$$= \sigma_x^2 + \sigma_y^2$$

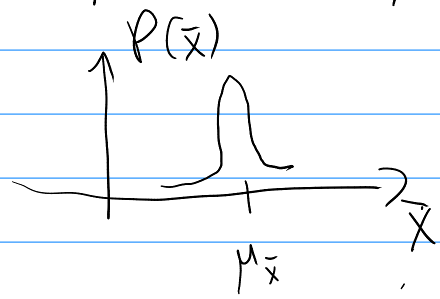


$$\sigma_{x+y}^2 = \sigma_x^2 + \sigma_y^2$$



$$X, \quad \mu = 8.2 \qquad \sigma_x = 0.2$$

$$\bar{X}, \quad \mu_{\bar{x}} \qquad \sigma_{\bar{x}} =$$



$$\sigma_{x_1 + x_2 + x_3 + \dots + x_n}^2 = \sigma_{x_1}^2 + \sigma_{x_2}^2 + \dots + \sigma_{x_N}^2$$

$$\sigma^2_{\Sigma x_i} = \Sigma \sigma^2_{x_i} = N\sigma_x^2$$

$$\sigma^2_{\Sigma x_i} = N\sigma_x^2$$

$$z = cX \qquad \sigma_z^2 = c^2\sigma_x^2$$

$$\frac{\Sigma(cX_i - c\mu)^2}{N}$$

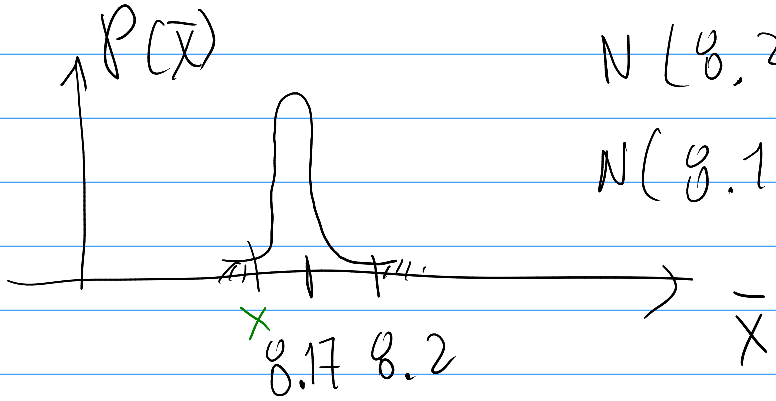
$$\frac{c^2\Sigma(X_i - \mu)^2}{N}$$

$$\sigma^2_{\Sigma x} = N\sigma_x^2$$

$$\sigma^2_{cx} = c^2\sigma_x$$

$$\mu = \frac{\Sigma x_i}{N} = \frac{1}{N}\Sigma x_i$$

$$\sigma_\mu^2 = \frac{1}{N^2}\sigma_{\Sigma x_i} = \frac{1}{N^2}N\sigma_x^2 = \frac{\sigma_x^2}{N}$$



$$N(8.2, \underbrace{0.02}^{\sigma_x})$$

$$N\left(8.17, \frac{0.02}{\sqrt{10}}\right) \quad \frac{\sigma_x}{\sqrt{N}}$$

cdf