

Cálculo do Valor mais Provável da Grandeza (mm): $\bar{a} = \frac{\sum a_i}{n}$

massa = ?

- diâmetro (D) mm da régua: $D_1 = 20,10 \text{ mm}$; $D_2 = 20,10 \text{ mm}$; $D_3 = 20,00 \text{ mm}$; $D_4 = 20,10 \text{ mm}$; $D_5 = 20,10 \text{ mm}$.

$$\bar{a} = \frac{20,10 + 20,10 + 20,00 + 20,10 + 20,10}{5} \rightarrow \bar{a} = 20,08 \text{ mm};$$

- altura (h) mm da régua: $h_1 = 20,10$; $h_2 = 20,20$; $h_3 = 20,10$; $h_4 = 20,10$; $h_5 = 20,10$.

$$\bar{a} = \frac{20,10 + 20,20 + 20,10 + 20,10 + 20,10}{5} \Rightarrow \bar{a} = 20,12 \text{ mm};$$

- diâmetro (D) mm do paquímetro: $D_1 = 18,00 \text{ mm}$; $D_2 = 18,00 \text{ mm}$; $D_3 = 18,00 \text{ mm}$; $D_4 = 18,00 \text{ mm}$; $D_5 = 18,00 \text{ mm}$.

$$\bar{a} = \frac{18,00 \cdot 5}{5} \rightarrow \bar{a} = 18,00 \text{ mm};$$

- altura (h) mm do paquímetro: $h_1 = 20,10 \text{ mm}$; $h_2 = 20,20 \text{ mm}$; $h_3 = 20,20 \text{ mm}$; $h_4 = 20,20 \text{ mm}$; $h_5 = 20,20 \text{ mm}$.

$$\bar{a} = \frac{20,10 + 20,20 + 20,20 + 20,20 + 20,20}{5} \rightarrow \bar{a} = 20,18 \text{ mm};$$

- diâmetro (D) mm do micrômetro: $D_1 = 18,41 \text{ mm}$; $D_2 = 18,41 \text{ mm}$; $D_3 = 18,41 \text{ mm}$; $D_4 = 18,41 \text{ mm}$; $D_5 = 18,41 \text{ mm}$.

$$\bar{a} = \frac{18,41 \cdot 5}{5} \rightarrow \bar{a} = 18,41 \text{ mm};$$

- altura (h) mm do micrômetro: $h_1 = 20,14 \text{ mm}$; $h_2 = 20,14 \text{ mm}$; $h_3 = 20,14 \text{ mm}$; $h_4 = 20,14 \text{ mm}$; $h_5 = 20,14 \text{ mm}$.

$$\bar{a} = \frac{20,14 \cdot 5}{5} \rightarrow \bar{a} = 20,14 \text{ mm}.$$

Cálculo da Densidade (g/mm^3): $\bar{\rho} = \frac{4 \bar{M}}{\pi \bar{D}^2 \bar{H}}$; utilizando-se $\pi = 3,14159$ e $\bar{M} = 42,58 \text{ g}$

- Com base nas medidas obtidas pela régua: $\bar{D} = 20,08 \text{ mm}$ e $\bar{H} = 20,12 \text{ mm}$.

$$\bar{\rho} = \frac{4 \cdot \bar{M}}{\pi \cdot \bar{D}^2 \cdot \bar{H}} \rightarrow \bar{\rho} = \frac{4 \cdot 42,58 \text{ g}}{3,14159 \cdot (20,08 \text{ mm})^2 \cdot 20,12 \text{ mm}} \rightarrow \bar{\rho} = \frac{170,32 \text{ g}}{25486,18877 \text{ mm}^3} \rightarrow \bar{\rho} = 0,006683 \text{ g}/\text{mm}^3;$$

- Com base nas medidas obtidas pelo paquímetro: $\bar{D} = 18,00 \text{ mm}$ e $\bar{H} = 20,18 \text{ mm}$.

$$\bar{\rho} = \frac{4 \cdot \bar{M}}{\pi \cdot \bar{D}^2 \cdot \bar{H}} \rightarrow \bar{\rho} = \frac{4 \cdot 42,58 \text{ g}}{3,14159 \cdot (18,00 \text{ mm})^2 \cdot 20,18 \text{ mm}} \rightarrow \bar{\rho} = \frac{170,32 \text{ g}}{20540,720 \text{ mm}^3} \rightarrow \bar{\rho} = 0,008292 \text{ g}/\text{mm}^3;$$

- Com base nas medidas obtidas pelo micrômetro: $\bar{D} = 18,41 \text{ mm}$ e $\bar{H} = 20,14 \text{ mm}$.

$$\bar{\rho} = \frac{4 \cdot \bar{M}}{\pi \cdot \bar{D}^2 \cdot \bar{H}} \rightarrow \bar{\rho} = \frac{4 \cdot 42,58 \text{ g}}{3,14159 \cdot (18,41 \text{ mm})^2 \cdot 20,14 \text{ mm}} \rightarrow \bar{\rho} = \frac{170,32 \text{ g}}{21444,5244 \text{ mm}^3} \rightarrow \bar{\rho} = 0,007942 \text{ g}/\text{mm}^3.$$