NÚMEROS IRRACIONAIS ($\mathbb{I}$)

NÃO PODEM SER ESCRITOS NA FORMA DE FRAÇÃO

- $\pi = 3{,}141592\ldots$
- $\sqrt{2} = 1{,}41\ldots$
- $\sqrt{3} = 1{,}73\ldots$
- $\sqrt{5} = 2{,}23\ldots$

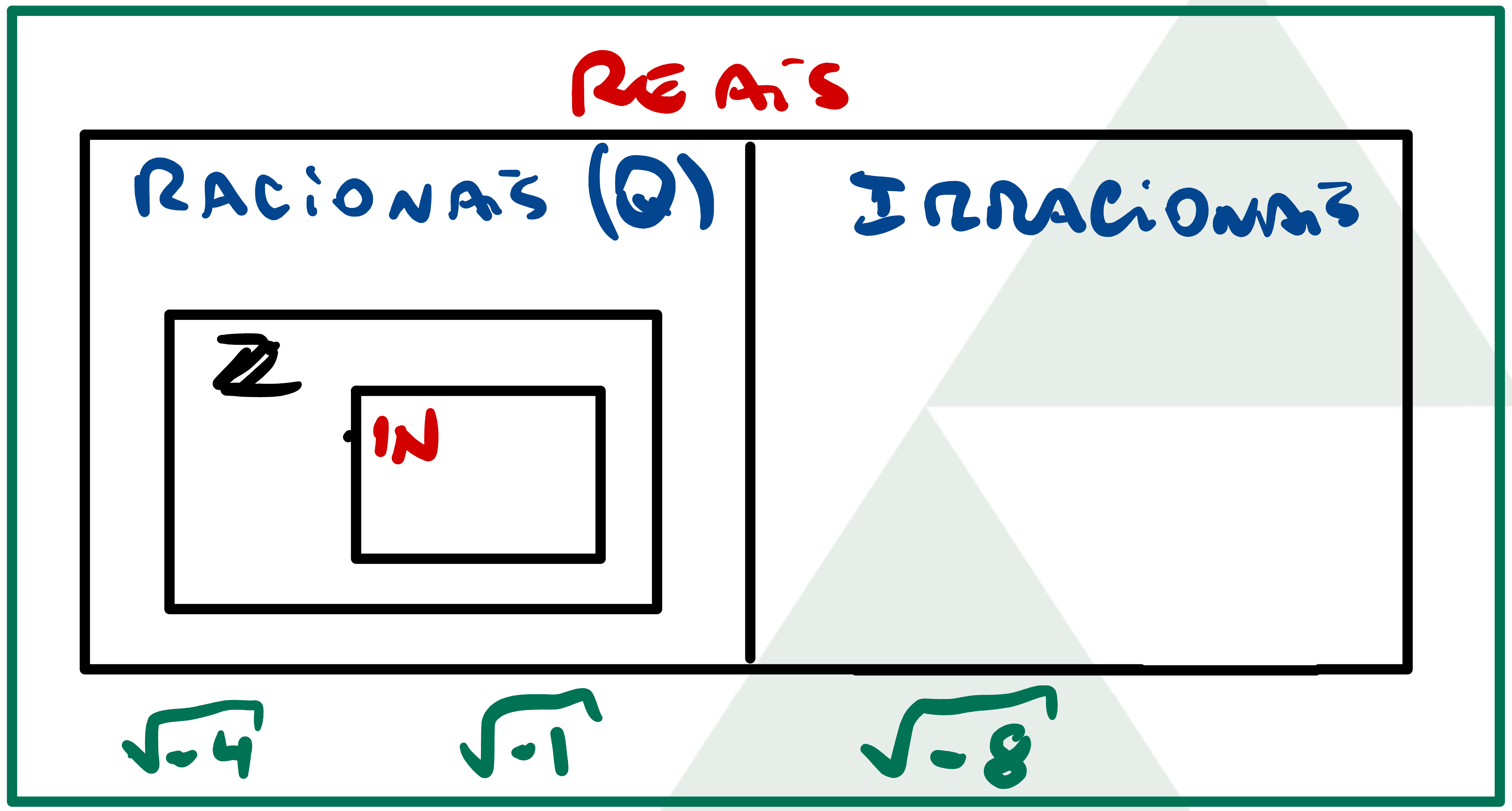
TODA RAIZ QUE NÃO É EXATA!!

TODO NÚMERO IRRACIONAL É UM DECIMAL INFINITO E NÃO-PERIÓDICO

NÚMEROS REAIS ($\mathbb{R}$)

$\mathbb{R} = \mathbb{Q} \cup \mathbb{I}$ ($\cup$ → UNIÃO)

COMPLEXOS ($\mathbb{C}$)



- $0{,}333\ldots : \mathbb{Q}$
- $3{,}14 : \mathbb{Q}$
- $\sqrt[3]{-8} = -2 \ (\mathbb{Q})$
- $\sqrt{-4} \notin \mathbb{R}$
- $\sqrt{-1} \notin \mathbb{R}$

Radicais

1 Propriedades

$$\rightarrow \boxed{a^{m/n} = \sqrt[n]{a^m}}$$

- $x^{3/5} = \sqrt[5]{x^3}$
- $16^{1/2} = \sqrt[2]{16} = 4$

$$\boxed{(\text{coisa})^{1/2} = \sqrt{\text{coisa}}}$$

- $8^{0,666...} = 8^{6/9} = 8^{2/3} = \sqrt[3]{8^2} = \sqrt[3]{64} = \sqrt[3]{2^6} = 2^{6/3} = 2^2 = 4$

- $4^{-\frac{1}{2}} = \left(\frac{1}{4}\right)^{\frac{1}{2}} = \sqrt{\frac{1}{4}} = \frac{1}{2}$

$$\boxed{\sqrt[n]{A}\cdot\sqrt[n]{B} = \sqrt[n]{A\cdot B}}$$

- $\sqrt{2}\cdot\sqrt{3} = \sqrt{6}$
- $\sqrt{2}\cdot\sqrt{8} = \sqrt{16} = 4$
- $\sqrt{3}\cdot\sqrt{3} = 3$
- $3\sqrt{2}\cdot 5\sqrt{2} = 15\cdot 2 = 30$
- $(4\sqrt{3})^2 = 16\cdot 3 = 48$

$$\boxed{\sqrt[m]{\sqrt[n]{A}} = \sqrt[m\cdot n]{A}}$$

- $\sqrt[3]{\sqrt{8}} = \sqrt[6]{8} = \sqrt[\cancel{6}\,2]{2^{\cancel{3}\,1}} = \sqrt{2}$

$\boxed{\text{Simplificação}}$

- $\sqrt{12} = \sqrt{2^2\cdot 3} = 2\sqrt{3}$
- $\sqrt{27} = \sqrt{3^3} = \sqrt{3^2\cdot 3} = 3\sqrt{3}$
- $\sqrt{24} = \sqrt{2^3\cdot 3} = \sqrt{2^2\cdot 2\cdot 3} = 2\sqrt{6}$
- $\sqrt{8} = \sqrt{2^3} = \sqrt{2^2\cdot 2} = 2\sqrt{2}$
- $5\sqrt{96} = 5\cdot\sqrt{2^5\cdot 3} = 5\cdot\sqrt{2^4\cdot 2\cdot 3} =$

$= 5\cdot 2^2\cdot\sqrt{6} = 20\sqrt{6}$

2 OPERAÇÕES

$$\boxed{(A+B)^2 = A^2 + 2A.B + B^2}$$

$$\boxed{(A+B)(A-B) = A^2 - B^2}$$

1) $(\sqrt{2}+3)^2 = (\sqrt{2})^2 + 2.\sqrt{2}.3 + 3^2 = 2 + 6\sqrt{2} + 9 = 11 + 6\sqrt{2}$

2) $(\sqrt{5}+2)(\sqrt{5}-2) = (\sqrt{5})^2 - 2^2 = 5 - 4 = 1$

3) $\dfrac{\sqrt{3}.(\sqrt{6}+\sqrt{3})}{3} = \dfrac{\sqrt{18}+3}{3} = \dfrac{3\sqrt{2}+3}{3} = \dfrac{\cancel{3}.(\sqrt{2}+1)}{\cancel{3}} = \boxed{\sqrt{2}+1}$

$$\begin{array}{r|l} 18 & 2 \\ 9 & 3 \\ 3 & 3 \\ 1 & \end{array}$$

4) $(\sqrt{2}+1)(2-\sqrt{2}) = 2\sqrt{2} - \cancel{2} + \cancel{2} - \sqrt{2} = \sqrt{2}$

$\sqrt{18} = \sqrt{2 \times 3^{\cancel{2}}} = 3\sqrt{2}$

MESTRES DA MATEMÁTICA

③ RACIONALIZAÇÃO DE DENOMINADORES

(TIRAR A RAIZ DO DENOMINADOR)

1º CASO

- $\dfrac{4}{\sqrt{2}} \times \dfrac{\sqrt{2}}{\sqrt{2}} = \dfrac{\overset{2}{\cancel{4}}\sqrt{2}}{\cancel{2}} = 2\sqrt{2}$

- $\dfrac{3}{5\sqrt{3}} \times \dfrac{\sqrt{3}}{\sqrt{3}} = \dfrac{\cancel{3}\sqrt{3}}{\cancel{15}\,5} = \dfrac{\sqrt{3}}{5}$

  $\dfrac{3}{5\sqrt{3}} \cdot \dfrac{5\sqrt{3}}{5\sqrt{3}} = \dfrac{\overset{\cancel{3}}{\cancel{15}}\sqrt{3}}{\underset{5}{\cancel{25}} \cdot \cancel{3}} = \dfrac{\sqrt{3}}{5}$

- $\dfrac{\sqrt{3}}{\sqrt{2}} \times \dfrac{\sqrt{2}}{\sqrt{2}} = \dfrac{\sqrt{6}}{2}$

MESTRES DA MATEMÁTICA

2º CASO — MULTIPLICAR PELO CONJUGADO

$$* \quad \frac{2}{(\sqrt{3}+1)} \times \frac{(\sqrt{3}-1)}{(\sqrt{3}-1)} = \frac{2.(\sqrt{3}-1)}{(\sqrt{3})^2 - 1^2} = \frac{\cancel{2}(\sqrt{3}-1)}{\cancel{2}} = \sqrt{3}-1$$

$$* \quad \frac{\sqrt{3}}{(3-\sqrt{3})} \times \frac{(3+\sqrt{3})}{(3+\sqrt{3})} = \frac{3\sqrt{3}+3}{3^2-(\sqrt{3})^2} = \frac{3\sqrt{3}+3}{6} = \frac{\cancel{3}(\sqrt{3}+1)}{\cancel{6}_2} = \frac{\sqrt{3}+1}{2}$$

$$* \quad \frac{\sqrt{2}-1}{(\sqrt{2}+1)} \times \frac{(\sqrt{2}-1)}{(\sqrt{2}-1)} = \frac{2-2\sqrt{2}+1}{2-1} = 3-2\sqrt{2}$$

6) Escrevendo o número $\dfrac{\sqrt{500}-3\overbrace{\sqrt{20}}^{2\sqrt{5}}+2-2\sqrt{5}}{\sqrt{5}-1}$ na forma $a+b\sqrt{c}$, o valor de $a+b+c$ é:

(PAG. 36)

a) 7

b) 9

c) 6

d) 11

e) 13

$$\sqrt{500} = \sqrt{5 \times 100} = 10\sqrt{5}$$

$$\sqrt{20} = \sqrt{4 \cdot 5} = 2\sqrt{5} \Rightarrow 3\sqrt{20} = 3 \cdot 2\sqrt{5} = 6\sqrt{5}$$

$$\frac{10\sqrt{5} - 6\sqrt{5} + 2 - 2\sqrt{5}}{\sqrt{5}-1} = \frac{2\sqrt{5}+2}{\sqrt{5}-1} \times \frac{\sqrt{5}+1}{\sqrt{5}+1} =$$

$$= \frac{2\sqrt{5}\cdot\sqrt{5} + 2\sqrt{5} + 2\sqrt{5} + 2}{(\sqrt{5})^2 - 1^2} = \frac{10 + 4\sqrt{5} + 2}{4} = \frac{12 + 4\sqrt{5}}{4}$$

$$\frac{4(3+\sqrt{5})}{4} = \boxed{3+\sqrt{5}} = \boxed{A + B\sqrt{C}}$$

$$3 + 1 \cdot \sqrt{5}$$

$$\begin{cases} C = 5 \\ A = 3 \\ B = 1 \end{cases}$$

+

+

9