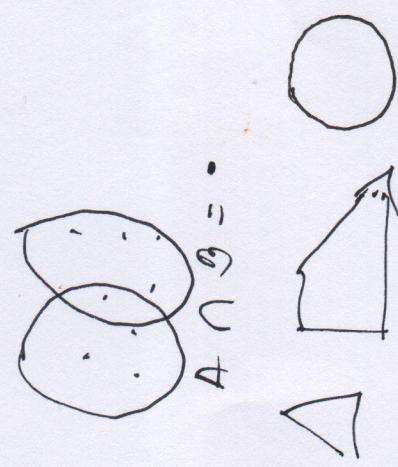


MATHEMATIK / computation

○ was ist matematik?

$$\begin{aligned} \textcircled{1} \quad 2+2 &= 4 \\ \textcircled{2} \quad x-2 &= 4 \\ x &= 4+2 \\ x &= 6 \end{aligned}$$



$$\left| \begin{array}{l} 2x^2 \\ 3x^4 \end{array} \right| = 8-6 = 2$$

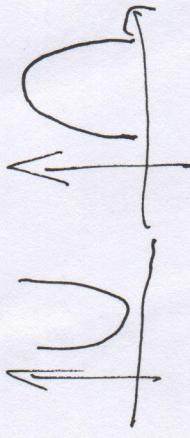
$$100\% \Rightarrow 10\% \Rightarrow 100\%$$

$$\sqrt{4} = 2$$

$$\sqrt{9} = 3$$

$$\frac{1}{2} + \frac{1}{3} = \frac{3+4}{6} = \frac{7}{6}$$

$$\begin{aligned} \Delta &= ? \quad b^2 - 4ac \\ x_1 &= -b \pm \sqrt{D} \\ x_2 &= \frac{-b}{2a} \end{aligned}$$



$$f(x) = x+1$$

$$\int \frac{df}{dx}$$

connection

algorithm

Loops
Case 1
Case 2

Sum = A + B

Circle = 3000

- PHP
- Java
- Python
- C/C++
- Go
- C/C++

Iteration

Processor

RAM

Processor

RAM

Processor

RAM

Variables

Normatif

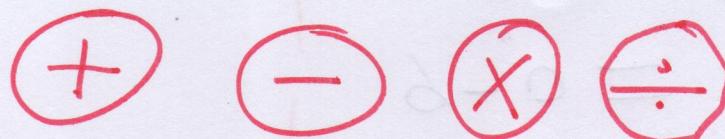
- 1 - PERKIL
- 2 - LOGIC PROPOSITION
- 3 - TEOREM AT CONVENTS
- 4 - PROOF BY CLASS
- 5 - TANGGAL
- 6 = APPLICATOR MATH.

①

MATEMÁTICA

1º LIBRO \rightarrow ALDOYNY \rightarrow 1744

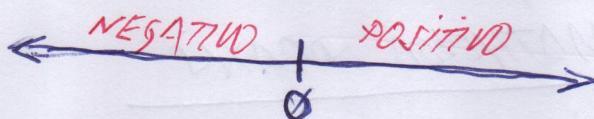
OPERACIONES FUNDAMENTALES



1.5/NAIS

⊕ ⊖

TIPOS NUMÉRICOS



NÚMEROS (N) = {0, 1, 2, 3, ...}

$$\frac{1}{1} = \frac{1}{2} + \frac{1}{2}$$

ENTEROS (Z) = {..., -3, -2, -1, 0, 1, 2, 3, ...}

FRACTIONARIOS (Q) = $\left\{ \frac{1}{2}, 0.5, \frac{10}{2}, \dots \right\}$ 0,222
RACIONALES

IRRACIONALES (π) = $\pi = 3,141592\dots$

REALES (R) = ... $\sqrt{2} = 1,4142\dots$

$e = 2,718281\dots$

COMPLEJOS (C) = $a + bi$

Aequazione Generale per x

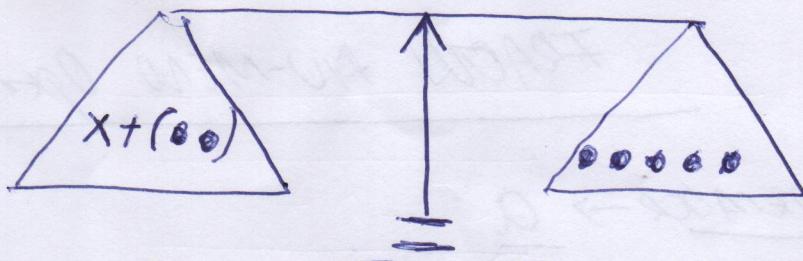
$$ax + b = c$$

$$\begin{array}{c}
 | - - - - - \\
 | \quad ax + b = c \\
 | \quad ax + b - b = c - b \\
 | \quad ax = c - b \\
 | \quad \frac{dx}{a} = \frac{c - b}{a} \\
 | \quad x = \frac{c - b}{a} \\
 | - - - - - \\
 \end{array}$$

MATHEMATISCHE PRAXIS

$$\begin{array}{ccc}
 x + 5 = 15 & | & 2x + 8 = 18 & | & 3x - 6 = 12 \\
 x + 5 - 5 = 15 - 5 & | & 2x + 8 - 8 = 18 - 8 & | & 3x - 6 + 6 = 12 + 6 \\
 x = 10 & | & 2x = 10 & | & 3x = 18 \\
 & | & \frac{2x}{2} = \frac{10}{2} & | & \frac{3x}{3} = \frac{18}{3} \\
 & | & x = 5 & | & x = 6
 \end{array}$$

(2)



$$\left| \begin{array}{l} x+2 = 5 \\ x+2-2 = 5-2 \end{array} \right\}$$

$$\left| \begin{array}{l} x = 3 \\ - \end{array} \right\}$$

Exercício $\Rightarrow x+3=7$ $x-6=9$

$$x-2=5$$

$$x+6=9$$

$$x+1=3$$

$$x+5=9$$

$$x+1=4$$

$$\underline{\underline{x+2=7}}$$

$$x-1=3$$

$$x+4=7$$

$$x-4=7$$

$$x-5=9$$

$$x-1=4$$

$$\underline{\underline{x-3=8}}$$

$$\left| \begin{array}{l} 2x+3=7 \\ 2x+3-3=7-3 \end{array} \right.$$

$$\left| \begin{array}{l} 2x=4 \\ x=2 \end{array} \right.$$

$$\left| \begin{array}{l} 2x-3=2 \\ 2x-3+3=2+3 \end{array} \right.$$

$$\left| \begin{array}{l} 2x=10 \\ x=5 \end{array} \right.$$

$$\left| \begin{array}{l} 2x=10 \\ \frac{2x}{2}=\frac{10}{2} \end{array} \right.$$

Exercício \Rightarrow

$$3x+1=10 \quad 5x+2=7 \quad 6x+3=9 \quad 4x+1=13$$

$$3x-1=11 \quad 5x-2=3 \quad 6x-3=9 \quad 4x-1=7$$

$$2x+8=10 \quad 6x-5=7$$

FRACTION ADDITION Operations

Numerator → $\frac{a}{b}$ → denominator

$$\begin{array}{c}
 | & & & & \\
 | & \frac{a}{b} + \frac{c}{d} & & & \\
 | & \frac{a \cdot d + b \cdot c}{b \cdot d} & & & \\
 | & \frac{a \cdot d \pm b \cdot c}{b \cdot d} & & & \\
 | & & & & \\
 \hline
 \end{array}$$

$$Ex: \frac{1}{2} + \frac{1}{3} = \frac{1 \cdot 3}{2 \cdot 3} + \frac{1 \cdot 2}{3 \cdot 2} = \frac{3}{6} + \frac{2}{6} = \frac{5}{6}$$

$$\begin{array}{c}
 \frac{3}{2} + \frac{4}{3} = \frac{3 \cdot 3}{2 \cdot 3} + \frac{4 \cdot 2}{3 \cdot 2} = \frac{9}{6} + \frac{8}{6} = \frac{17}{6} \\
 \hline
 \end{array}$$

PRAXIS // 1) $\frac{3}{5} + \frac{1}{2}$ // 2) $\frac{2}{5} - \frac{1}{4}$ // 3) $\frac{1}{2} + \frac{3}{5}$ // 4) $\frac{1}{4} + \frac{2}{5}$ // 5) $\frac{1}{7} + \frac{1}{8}$

F) $\frac{4}{5} + \frac{1}{6}$ // G) $\frac{2}{3} + \frac{1}{4}$ // H) $\frac{4}{3} + \frac{2}{5}$ // I) $\frac{2}{4} + \frac{1}{4}$ // J) $\frac{1}{8} + \frac{7}{8}$

K) $\frac{4}{7} + \frac{2}{7}$ // L) $\frac{1}{7} + \frac{2}{3}$

(5)

$$A) \frac{4}{2} - \frac{1}{2} / B) \frac{3}{4} - \frac{2}{4} / C) \frac{5}{3} - \frac{2}{3} / D) \frac{3}{7} - \frac{2}{7} / E) \frac{2}{5} - \frac{1}{5}$$

$$F) \frac{4}{2} - \frac{1}{4} / G) \frac{1}{2} - \frac{1}{3} / H) \frac{4}{3} - \frac{2}{5} / I) \frac{5}{2} - \frac{1}{4} / J) \frac{3}{2} - \frac{1}{3}$$

$$K) 1 + \frac{2}{3} / L) 1 + \frac{2}{5} / M) 2 + \frac{1}{7} / N) 3 + \frac{2}{6} / O) 4 + \frac{1}{5} / P) 6 + \frac{4}{3}$$

$$Q) 1 - \frac{2}{3} / R) 1 - \frac{3}{4} / S) 3 - \frac{2}{6} / T) 4 - \frac{1}{6} / U) 6 - \frac{1}{5}$$

FRACTIONES SCRIPTORUM EXPONENDI

EXEMPLUM

$$\begin{array}{c|c|c}
\frac{\frac{a}{b}}{\frac{c}{d}} & = & \frac{a \cdot d}{b \cdot c} \\
\hline
\frac{b \cdot \frac{a \cdot d}{b \cdot c}}{d \cdot \frac{a \cdot d}{b \cdot c}} & = & \frac{4}{5} = \frac{\cancel{5} \cancel{4} \cdot 3}{\cancel{5} \cdot \cancel{2} \cdot 3} = \frac{4 \cdot 3}{5 \cdot 2} = \\
\hline
\frac{a \cdot d}{b \cdot c} & = & \frac{4 \cdot 3 \cdot 1}{5 \cdot 2} = \frac{6}{5}
\end{array}$$

$$\text{MAX/J} \left| \begin{array}{c} \frac{1}{4} \\ \frac{1}{8} \end{array} \right. \left| \begin{array}{c} \omega^2 \\ \frac{4}{5} \end{array} \right. \left| \begin{array}{c} 1 \\ \omega N \end{array} \right. \left| \begin{array}{c} \frac{4}{3} \\ 2 \end{array} \right. \left| \begin{array}{c} 6 \\ 4 \end{array} \right.$$

$$\frac{1}{\frac{1}{4}} = \left| \begin{array}{c} \frac{1}{8} \\ \frac{1}{6} \end{array} \right. \left| \begin{array}{c} \frac{1}{2} \\ \frac{1}{2} \end{array} \right. \left| \begin{array}{c} \frac{2}{6} \\ \frac{6}{8} \end{array} \right. \left| \begin{array}{c} \frac{2}{5} \\ \frac{2}{5} \times 3 \end{array} \right. = \frac{\omega^2 \times 3}{5 \times 3} = \frac{2}{5 \times 3} = \frac{2}{15}$$

~~$$\left| \begin{array}{c} \frac{2}{8} \\ 5 \end{array} \right. \left| \begin{array}{c} \frac{8}{4} \\ 4 \end{array} \right. \left| \begin{array}{c} \frac{5}{2} \\ 6 \end{array} \right.$$~~

$$\frac{1}{\frac{1}{2}} = \frac{2 \times 1}{2 \times \frac{1}{2}} = \frac{2}{1}$$

Ex: a) $\frac{1}{\frac{1}{4}}$ b) $\frac{1}{\frac{5}{2}}$ c) $\frac{5}{\frac{3}{2}}$ d) $\frac{8}{\frac{4}{5}}$ e) $\frac{5}{\frac{2}{3}}$

(4)

POTENCIJ PRAXIS

$$4 \cdot 4 \cdot 4 \times 4 \cdot 4 = 4^3 \cdot 4^2 = 4^5$$

$$\frac{3 \cdot 3 \cdot 3 \cdot 3 \cdot 3}{3 \cdot 3 \cdot 3} = \frac{3^5}{3^3} = 3^{5-3} = 3^2$$

$$\frac{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2}{2 \cdot 2 \cdot 2} = \frac{2^6}{2^3} = 2^{6-3} = 2^3$$

$$\frac{4^2 \cdot 4^{-3} \cdot 4^4}{4^{-2} \cdot 4^3 \cdot 4^{-2}} = \frac{4^{(2-3+4)}}{4^{(-2+3-2)}} = \frac{4^3}{4^{-1}} = 4^{3+1} = 4^4$$

$$\underline{\text{CANON}} = \text{LEI}$$

$$x^a \cdot x^b = x^{a+b}$$

$$\frac{x^a}{x^b} = x^{a-b}$$

$$\boxed{x^0 = 1}$$

PLAXIS

a) $2.2 \times 2.2 =$

b) $3.3 \times 3.3 =$

c) $3.3 \times 3 =$

d) $4 \times 4.4.4 =$

e) $5.55 \times 5 =$

f) $7.7 \times 7.7 =$

g) $\frac{3.3.3}{3.3} =$

h) $\frac{6.6.6}{6} =$

i) $\frac{9.9.9.9}{9.9.9} =$

j) $\frac{4.4.4.4}{4} =$

k) $\frac{3.3.3.3}{2.3.3} =$

4) $\frac{2^1}{2^1}$

h) $\frac{4^3}{4^3}$

g) $\frac{3^3}{3^3}$

n) $\frac{5^5}{5^5}$

POTÊNCIA NEUTRAIS

$$\frac{1}{3^2} = \frac{1}{3^2} \cdot \frac{3^{-2}}{3^{-2}} = \frac{3^{-2}}{3^0} = 3^{-2}$$

$$\frac{2}{3^4} = \frac{2}{3^4} \cdot \frac{3^{-4}}{3^{-4}} = \frac{2 \cdot 3^{-4}}{3^0} = \frac{2 \cdot 3^{-4}}{1} = 2 \cdot 3^{-4}$$

EXERCÍCIO

4) $\frac{1}{2^3} =$

5) $\frac{1}{2^{-4}} =$

6) $\frac{1}{6^2} =$

7) $\frac{1}{7^{-2}} =$

8) $\frac{1}{7^1} =$

9) $\frac{1}{4^{-2}} =$

10) $\frac{1}{4^2} =$

I) $\frac{1}{3^{-2}} =$

11) $\frac{1}{3^4} =$

J) $\frac{1}{3^{-4}} =$

⑥

EXERCICIO

$$\frac{3^5 \times 3^2 \times 3^4}{3^3 \times 3^6} = \frac{3''}{3^9} = 3^{11} \times 3^{-9} = 3^2 = 9$$

4) $\frac{7^3 \times 7^9 \times 7^{-2} \times 7^1}{7^5 \times 7^2 \times 7^{-1}} =$

5) $\frac{3^6 \times 3^1 \times 3^{-2}}{3^4 \times 3^3} =$

c) $\frac{5^2 \times 5^{-2} \times 5^{-3} \times 5^9}{5^2 \times 5^2 \times 5^1} =$

d) $\frac{2^{-3} \times 2^{-3} \times 2^{-2}}{2^{-2} \times 2^{-1} \times 2^{-6}} =$

e) $\frac{2^6 \times 2^7 \times 2^{-4} \times 2^{-3}}{2^1 \times 2^2 \times 2^2} =$

(7)

EXEMPLO 7

$$\left[\frac{4}{3} \right]^{-2} = \frac{\left[\frac{4}{3} \right]^{-2} \cdot \left[\frac{4}{3} \right]^2}{\left[\frac{4}{3} \right]^2} = \frac{\left[\frac{4}{3} \right]^{-2+2} \left[\frac{4}{3} \right]^0}{\left[\frac{4}{3} \right]^2} = \frac{1}{\left[\frac{4}{3} \right]^2} = \frac{1}{\frac{16}{9}} =$$

$$= \frac{1}{\frac{16}{9}} = \frac{1}{\frac{16}{9}} \times \frac{9}{9} = \frac{9}{16} \Rightarrow \left[\frac{4}{3} \right]^{-2} = \left[\frac{3}{4} \right]^2 = \frac{9}{16}$$

A) $\left[\frac{3}{2} \right]^{-1}$

B) $\left[\frac{7}{3} \right]^{-3}$

C) $\left[\frac{2}{5} \right]^{-2}$

CINCO → CÉRADO NO OESTE

(8)

DECIMAL POTENCIAS

$$10^3 = 1000$$

$$10^2 = 100$$

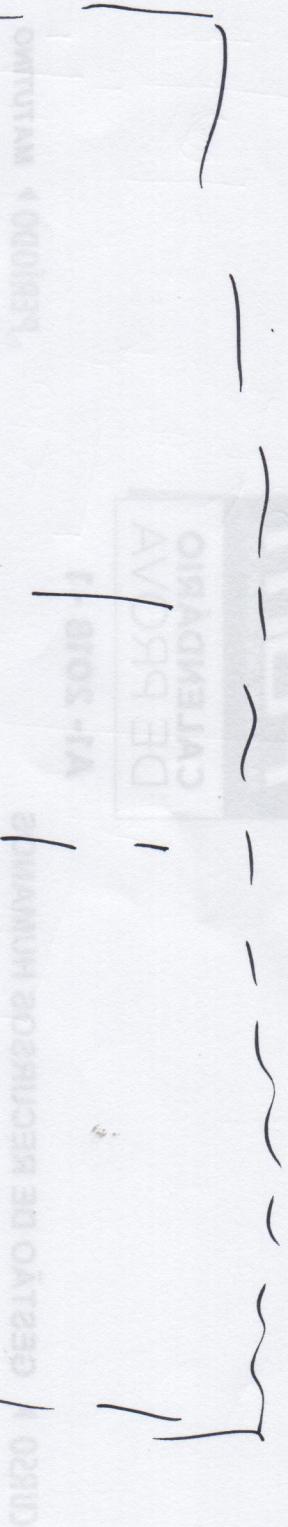
$$10^1 = 10$$

$$10^0 = 1$$

$$10^{-1} = 0,1$$

$$10^{-2} = 0,01$$

$$10^{-3} = 0,001$$



DECIMAL PRAXIS

(9)

$$3 \times 10^{-2} = \frac{3}{10^2} = \frac{3}{100} = 0,03$$

$$0,005 = 0,001 \times 5 = \frac{1 \cdot 5}{1000} = \frac{1}{10^3} \cdot 5 = 5 \cdot 10^{-3}$$

$$\frac{5 \times 10^{-3} \cdot 3 \times 10^{24}}{2 \times 10^2} = \frac{15 \times 10^{21}}{2 \times 10^2} = \frac{15}{2} \cdot 10^{21-2} = \frac{15}{2} \cdot 10^{19}$$

PRAXIS

A) 1×10^{-1}

B) 2×10^{-1}

C) 4×10^{-2}

D) 9×10^{-2}

E) 6×10^{-3}

F) 2×10^{-3}