

MAT. BÁSICA

potenciação

$$a^{-1} = \frac{1}{a}$$

$$\left(\frac{a}{b}\right)^x = \frac{a^x}{b^x}$$

$$\sqrt[p]{a} \cdot \sqrt[p]{a} = \sqrt[p]{a^m}$$

$$\sqrt[n]{a^m \cdot b} = a^{\frac{m}{n}} \sqrt[n]{b}$$

$$\sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}$$

$$\sqrt[n]{a} \cdot \sqrt[n]{b} = \sqrt[n]{a \cdot b}$$

$$\sqrt[n]{a^m} = (\sqrt[n]{a})^m$$

$$\sqrt[n]{a^m} = a^{\frac{m}{n}}$$

$$\sqrt[m]{\sqrt[n]{a}} = \sqrt[m \cdot n]{a}$$

$$(a^x)^y = a^{x \cdot y}$$

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

$$a^x = a^{x-y} \cdot a^y$$

dízimas

$$\frac{3}{7} = 0,428571$$

$$0,123333... = \frac{123-12}{900}$$

$$0,1111... = 0,1 \text{ PERÍODO SIMPLES } \rightarrow \frac{1}{9}$$

$$0,2131313... = \frac{213-2}{990}$$

$$0,131313... = 0,1\bar{3} \rightarrow \frac{13}{99}$$

$$0,74621747474... = \frac{7462174}{9900000}$$

$$0,123123... = 0,1\bar{23} \rightarrow \frac{123}{999}$$

7462174

9900000

ARITMÉTICA DOS INTEIROS

QUANTIDADE DE DIVISORES

$$N = p_1^{\alpha_1} \cdot p_2^{\alpha_2} \cdot \dots \cdot p_n^{\alpha_n}$$

$$(\alpha_1 + 1) \cdot (\alpha_2 + 1) \cdot \dots \cdot (\alpha_n + 1)$$

QUANTIDADE DE \ominus POSITIVOS

$$12 = 2^2 \cdot 3^1$$

$$(2+1)(1+1) = 3 \cdot 2 = 6$$

12		2
6		2
3		3
1		

* elimina o 0 do conjunto

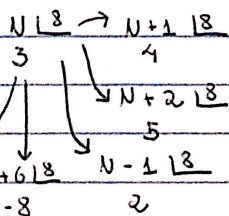
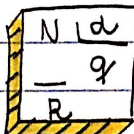
$$\text{MMC}(a, b) \cdot \text{MDC}(a, b) = ab$$

$$2 \cdot 10 = 6 \cdot 30 \cdot 42$$

30	42		2	MDC(30, 42) = 6
15	21		3	
5	7		5	
1	7		7	
1	1		1	MMC(30, 42) = 210

CONJUNTOS NUMÉRICOS

DIVISÃO EUCLIDIANA



$$N - 6 | 3$$

$$\underbrace{-3 + 6}_5$$

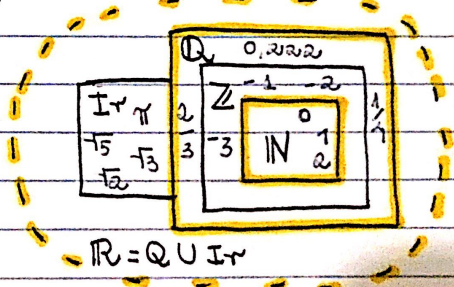
$$N + 6 | 3$$

$$\underbrace{9 - 8}_1$$

$$N - 1 | 3$$

$$2$$

$R < \text{DIVISOR}$



$$\mathbb{R} = \mathbb{Q} \cup \mathbb{I}$$

PRODUTOS NOTÁVEIS

• $(a + b)^2 = a^2 + 2ab + b^2$

• $(a + b) \cdot (a - b) = a^2 - b^2$

• $(a - b)^2 = a^2 - 2ab + b^2$

• $(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$

• $(a - b)^3 = a^3 - 3a^2b + 3ab^2 + b^3$

fatoração

• $\frac{x^2 - y^2}{x + y} = x \cdot \frac{(x + y)(x - y)}{x + y}$

• $\frac{2x + 3y}{6x + 9y}$

• $\frac{x^2 + xa + 2y + 2a}{x + a}$

• $\frac{2x + 3y}{3(2x + 3y)}$

• $\frac{x(y + a) + 2(y + a)}{x + 2}$

• DIFERENÇA DE QUADRADOS

$\sqrt{x^2} - \sqrt{y^2} = (x + y) \cdot (x - y)$

$\frac{1}{3}$

• $\sqrt{49x^2 - 1} = (7x + 1) \cdot (7x - 1)$

• $\frac{(y + a)(x + 2)}{x + 2}$

• PRODUTO DE STEVIN

$$\begin{array}{ccc}
 x^2 + 5x + 6 & x^2 + 6x + 8 & y + a \\
 \downarrow & \downarrow & \downarrow \\
 a + b & a \cdot b & 2 + 4 \quad 2 \cdot 4 \\
 (x + a) & (x \cdot b) & (x + 2) \quad (x + 4)
 \end{array}$$

PORCENTAGEM

$$\left\{ \begin{array}{l} P\% \text{ DE } X \\ \downarrow \\ \frac{P}{100} \cdot X \end{array} \right\}$$

acréscimos e descontos

$$\boxed{+P\% : (100\% + P\%)}$$

200 → +10% → +20%

$$\boxed{-P\% : (100\% - P\%)}$$

+60% → -40% → -10%

variação percentual

$$200 \cdot \underbrace{1,10 \cdot 1,20}_{\oplus} \cdot \underbrace{0,60 \cdot 0,90}_{\ominus} = 2.28,09$$

$$\boxed{\text{VAR.}\% = \frac{f - i}{i} \cdot 100}$$

GRANDEZAS

diretamente

$$\boxed{X = K \cdot y}$$

inversamente

$$\boxed{X = \frac{K}{y}}$$

ESTATÍSTICA

MÉDIA ARITMÉTICA

$$\bar{X} = MA = \frac{\text{SOMA}}{\text{QUANT.}}$$

$$\bar{X}_H \leq \bar{X}_G \leq \bar{X}$$

MÉDIA GEOMÉTRICA

$$\bar{X}_G = MG = \frac{\text{QNTD}}{\text{PRODUTO}}$$

$$\bar{X}_H = \bar{X}_G = \bar{X} \Rightarrow \text{ELEMENTOS} = 5$$

MÉDIA HARMÔNICA

$$\bar{X}_H = MH = \frac{\text{QUANT.}}{\text{SOMA DOS INVERSOS}}$$

AMOSTRA $\rightarrow 1, 2, 1, 2, 1$

moda

mediana

ELEMENTO ⊕ FREQUENTE

ELEMENTO CENTRAL DO

AMODAL - TDS C/ A

Mo = 1

Mo = 2

ROL (ORDEM CRESC/DECRESC)

MESMA FREQUÊNCIA

ÍMPAR = SOMA DO 2 CENTRAIS

média ponderada (ARITMÉTICA)

PESO (IMPORTÂNCIA)

$$\bar{X} = \frac{\text{SOMA}}{\text{QNTD}} \rightarrow$$

$$\frac{\bar{X}_1 \cdot P_1 + \bar{X}_2 \cdot P_2 + \bar{X}_3 \cdot P_3}{P_1 + P_2 + P_3}$$

$$VAR = \frac{(x_1 - \bar{x})^2 + (x_2 - \bar{x})^2 + \dots}{n(\text{QUANTO})}$$

$$D_p = \sqrt{VAR}$$

PROPRIEDADES

POTÊNCIAS

- $a^p \cdot a^q = a^{p+q}$
- $\frac{a^p}{a^q} = a^{p-q}$
- $(a^p)^q = a^{p \cdot q}$
- $(a \cdot b)^p = a^p \cdot b^p$
- $a^0 = 1$
- $a^{\pm} = a$
- $\left(\frac{a}{b}\right)^p = \frac{a^p}{b^p}$
- $0^0 \rightarrow$ INDETERMINAÇÃO
- $\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^n$

RADICAIS

- $\sqrt[p]{a^p \cdot b} = a^p \sqrt{b}$
- $\sqrt[p]{\sqrt[q]{a}} = \sqrt[p \cdot q]{a}$
- $\sqrt[p]{a^{\frac{q}{r}}} = a^{\frac{q}{p \cdot r}}$

MDC E MMC

- $m m c(a, b) \cdot m m d(a, b) = a \cdot b$
- $m m c(a, b) \rightarrow$ TABUADA, FUTURO
- $m d c(a, b) \rightarrow$ MENOR ELEMENTO COMUM DA DIVISÃO EXATA / MÁXIMO

• ÂNGULOS E TRIÂNGULOS

TRIÂNG. RETÂNGULO

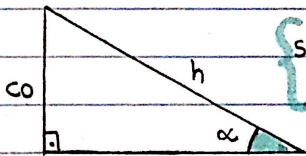
$$a^2 = b^2 + c^2$$

ALTURA Δ RETÂNGULO

$$h = \frac{ab}{c}$$

DIAGONAL QUADRADO

$$D = \sqrt{2} \cdot l$$



$$\left\{ \begin{aligned} \text{SEN } \alpha &= \frac{CO}{h} \\ \text{COS } \alpha &= \frac{CA}{h} \\ \text{TG } \alpha &= \frac{CO}{CA} \end{aligned} \right.$$

$$\text{COS } \alpha = \frac{CA}{h}$$

$$\text{TG } \alpha = \frac{CO}{CA}$$

$$\text{TG } \alpha = \frac{\text{SEN}}{\text{COS}}$$

$$\text{SEN}^2 \alpha + \text{COS}^2 \alpha = 1$$

$$\text{SE } \alpha + \beta = 90^\circ$$

$$\left\{ \begin{aligned} \text{COS } \alpha &= \text{SEN } \beta \\ \text{TG } \alpha \cdot \text{TG } \beta &= 1 \end{aligned} \right.$$

	30°	45°	60°
SEN	1/2	√2/2	√3/2
COS	√3/2	√2/2	1/2
TAN	√3/3	1	√3

CÔNCAVO (MAIOR Q 180°)
 CONVEXO (MENOR Q 180°)

TEOREMA ANGULAR DE TALES

$$\left\{ \begin{aligned} \hat{A} + \hat{B} + \hat{C} &= 180^\circ \\ S_{\hat{A}} &= 180^\circ \quad S_{\hat{B}} = 360^\circ \end{aligned} \right.$$

ÂNGULOS NO Δ

$$\hat{A} + \hat{B} = 180^\circ$$

$$\left\{ \begin{aligned} 1^\circ &- 90^\circ \\ 1' &- 90'' \end{aligned} \right.$$

ÂNGULOS

COMPLEMENTARES } complemento
 $x + y = 90^\circ$ } de $x : 90 - x$

CONGRUENTES \rightarrow MESMO TAMANHO
 E MESMA FORMA

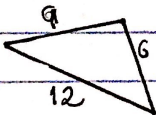
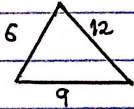
SUPLEMENTARES } complemento
 $x + y = 180^\circ$ } de $x : 180 - x$

SEMElhANTES \rightarrow MESMA FORMA
 EQUIVALENTES \rightarrow MESMO TAMANHO

REPLEMENTARES } complemento
 $x + y = 360^\circ$ } de $x : 360 - x$

\nearrow ângulo oposto

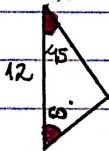
LLL



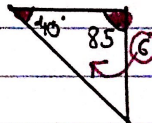
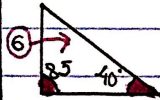
LAL



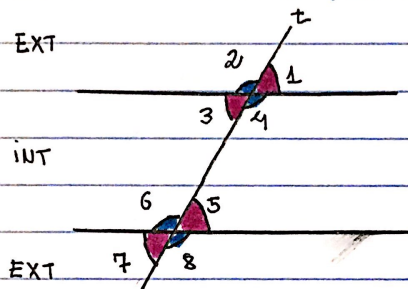
ALA



LAA



ÂNGULOS



colaterais
 SUPLEMENTARES → INTERNOS 4 e 5, 3 e 6
 → EXTERNOS 1 e 8, 2 e 7

alternos
 CONGRUENTES → INTERNOS 4 e 6, 3 e 5
 → EXTERNOS 1 e 7, 2 e 8

correspondentes → 1 e 5, 2 e 6, 3 e 7, 4 e 8

TEOREMA ANGULAR DE TALES

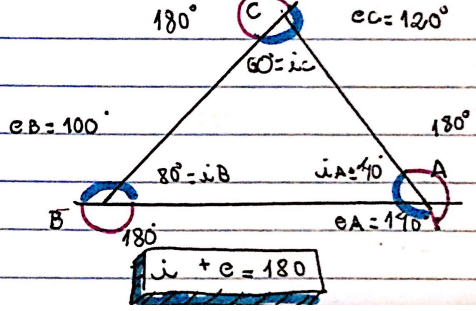
$$\hat{A} + \hat{B} + \hat{C} = 180^\circ$$

$$Si = 180^\circ$$

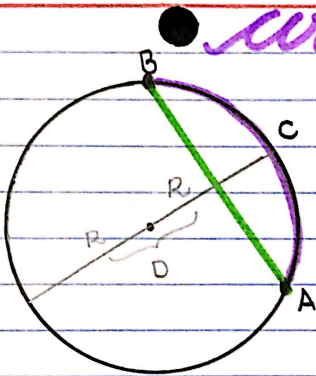
$$Su = 360^\circ$$

$$\left\{ \begin{array}{l} eA = iB + iC \\ eB = iA + iC \\ eC = iA + iB \end{array} \right.$$

ÂNGULOS NOS TRIÂNGULOS



circulo e CIRCUNFERÊNCIA



\overline{AB} : CORDA

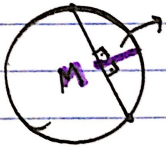
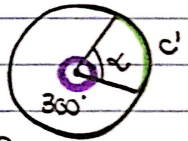
\widehat{AB} : ARCO

$$\left\{ \begin{array}{l} 360^\circ - 2\pi R \\ \alpha - C' \end{array} \right.$$

• MEDIDA DO ARCO (GRAUS, RADIANO...)

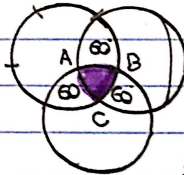
• MEDIDA DO COMPRIMENTO DO ARCO (cm, m, Km...)

$$C = 2\pi R$$



FLECHA

$$D = 2R$$



$$360^\circ - 2\pi R$$

$$\alpha - C'$$

$$180^\circ (60^\circ + 60^\circ + 60^\circ)$$

• CONJUNTOS

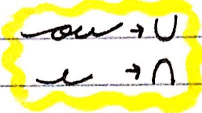
$\{x\}, y$
 \downarrow CONJ \downarrow ELEM

PERTINÊNCIA

- \in → PERTENCE
- \notin → NÃO PERTENCE
- \subset → ESTÁ CONTIDO
- \supset → CONTÉM
- $\not\subset$ ou $\not\supset$ → NEGATIVO

ELEM → CONJ

CONJ ↔ CONJ



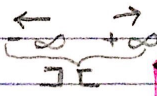
- CONJUNTO VAZIO - \emptyset
- CONJ. UNITÁRIO - SÓ Δ
- CONJ. UNIVERSO - U

OPERAÇÕES

- UNIÃO [U]
- INTERSECÇÃO [∩] - COMUM
- DIFERENÇA [-] - EXCLUIR

SUBCONJUNTO

$C^A = \bar{A} \quad (U - A)$

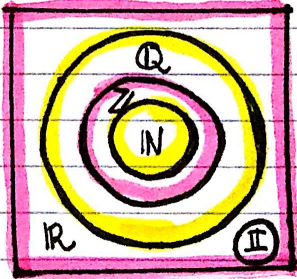


CONJ. DAS PARTES

TOTAL SUBCONJ

$2^{\mathbb{Q}} \rightarrow$ N° ELEMENTOS

- $\emptyset \subset A$
- $A \supset \emptyset$
- 0 E NEUTRO



- > MAIOR QUE 0
- ≥ MAIOR / IGUAL 0
- < MENOR QUE 0
- ≤ MENOR / IGUAL 0
- PERTENCE ● []
- NÃO PERTENCE ○] [()