

Lista 3 de Matemática Discreta

$$f \sim [(\forall x \geq 0)(\exists f > 0)(\forall \alpha \in D(f), 0 < |\alpha - x| < \delta \rightarrow |f(\alpha) - L| < \epsilon)] = 3$$

$$3\epsilon |7 - 2\alpha_j| + \rho |2\alpha - \alpha| \vee |2\alpha - \alpha| + \rho |2\alpha - \alpha| \vee |2\alpha - \alpha|, ((f) \exists x \in E) (0 < 3E) \equiv \mathcal{E}$$

Q2. $Q \leftrightarrow \sim R \wedge P$

V F R F V
F F V V V
V V F F F
F V V F F

$$P \rightarrow (Q \rightarrow (Q \rightarrow P))$$

$\begin{matrix} \text{A} & \text{D} & \text{C} & \text{C} \\ \text{B} & \text{C} & \text{C} & \text{C} \end{matrix}$

$$\sim (P \rightarrow (\sim P \rightarrow Q))$$

$\begin{matrix} \text{blue} & \text{red} \\ \downarrow & \downarrow \\ \text{blue} & \text{red} \end{matrix}$

$$P \wedge Q \rightarrow (P \leftrightarrow Q \vee R)$$

A handwriting practice sheet for the letter 'V'. It features a grid of 10 columns and 10 rows. The first column contains the letter 'V' in blue ink. The second column contains the letter 'V' in red ink. The third column contains the letter 'V' in black ink. The fourth column contains the letter 'V' in blue ink. The fifth column contains the letter 'V' in red ink. The sixth column contains the letter 'V' in black ink. The seventh column contains the letter 'V' in red ink. The eighth column contains the letter 'V' in black ink. The ninth column contains the letter 'V' in red ink. The tenth column contains the letter 'V' in black ink.

$$\sim p \wedge R \rightarrow Q \vee \underbrace{\sim R}$$

$\begin{matrix} \text{C} < \text{C} < \text{C} < \text{C} < \text{C} < \text{C} < \text{C} \\ \text{F} < \text{F} < \text{F} < \text{F} < \text{F} < \text{F} < \text{F} \\ \text{F} < \text{F} < \text{F} < \text{F} < \text{F} < \text{F} < \text{F} \\ \text{F} < \text{F} < \text{F} < \text{F} < \text{F} < \text{F} < \text{F} \\ \text{C} < \text{C} < \text{C} < \text{C} < \text{C} < \text{C} < \text{C} \end{matrix}$

$$P \rightarrow R \Leftrightarrow Q \vee \sim R$$

$\gamma < \gamma < \gamma < \gamma$

$$p \rightarrow (p \rightarrow \sim R) \leftrightarrow Q \vee R$$

[illegible]

major precedence

$(P \wedge Q \rightarrow R) \vee (\neg P \leftrightarrow Q \vee \neg R)$

T T F F T F F F

$\gamma \gamma \gamma \gamma < \gamma <$
 $\gamma \gamma \gamma \gamma \gamma \gamma <$
 $\gamma \gamma < \gamma \gamma <$
 $< < < < \gamma <$
 $\gamma < \gamma < \gamma < \gamma$
 $< < < < \gamma$
 $< < \gamma \gamma \gamma$
 $< \gamma < \gamma \gamma <$
 $< \gamma < \gamma <$
 $< \gamma < \gamma <$

$$P \rightarrow P \wedge Q \equiv P \rightarrow Q$$

$\begin{matrix} \text{F} & \text{F} & \text{V} & \text{V} \\ \text{V} & \text{V} & \text{F} & \text{F} \end{matrix}$

$$Q \leftrightarrow P \vee Q \equiv P \rightarrow Q$$

$\begin{matrix} F & V & V & V & V & V & V \\ F & F & V & V & V & V & V \\ F & F & F & V & V & V & V \\ F & F & F & F & V & V & V \\ F & F & F & F & F & V & V \\ F & F & F & F & F & F & V \end{matrix}$

$$(P \rightarrow Q) \wedge (P \rightarrow \neg Q) \equiv P \rightarrow (Q \wedge \neg Q)$$

Handwritten notes showing a sequence of letters V, F, and P arranged in columns. Some letters are circled in blue, and others are underlined in red. The sequence appears to be a permutation of V, F, and P.

$$(P \rightarrow Q) \vee (P \rightarrow R) \equiv P \rightarrow Q \vee R$$

A collection of handwritten practice strokes for the letter 'P'. The strokes are arranged in several rows and columns. Some are in red ink, some in blue ink, and some in black ink. The strokes vary in style, including simple vertical lines, loops, and more complex, stylized forms. Some strokes are underlined with a blue line.

2.22

$$\left(\begin{array}{l} (\forall x \in D)(P(x)) \\ (\exists x \in D)(P(x)) \end{array} \right)$$

Toda proposição universal verdadeira ser verdadeira a proposição existencial

Logo α está em D , \forall inclui α

2.14

- $a_2) (\forall x)(\forall y) (x+y > y+1) F$
 $a_3) (\forall x)(\exists y) (x \cdot y \text{ n\~{o} \text{e} primo}) V$
 $a_4) (\exists y) (\forall x) (x \cdot y \text{ n\~{o} \text{e} primo}) V$
 $a_5) (\exists x)(\exists y) (x^2 > y) V$
 $a_6) (\exists x)(\forall y) (x^2 > y) F$
 $a_7) (\forall x)(\forall y) (x+z) (x+y > z) F$
 $a_8) (\exists x)(\forall y) (\exists z) (x+y > z) F$
 $a_9) (\forall x)(\exists y) (\exists z) (x+y > z) F$
 $a_{10}) (\forall x)(\forall y) (\exists z) (x+y < z) V$
 $a_{11}) (\forall x)(\exists y) (\exists z) (x+y < z) V$
 $a_{12}) (\exists x)(\exists y) (\exists z) (x+y < z) V$
 $A_{13}) (\exists x)(\exists y) (\forall z) (x+y < z) F$

- $b_1) (\exists x)(\exists y) (x+y > y+1) V$
 $b_2) (\exists x)(\forall y) (x \cdot y \text{ \text{e} primo}) F$
 $b_3) (\forall y) (\exists x) (x \cdot y \text{ \text{e} primo}) F$
 $b_4) (\forall x)(\forall y) (x^2 < y) F$
 $b_5) (\exists x)(\forall y) (x^2 < y) F$
 $b_6) (\forall x)(\exists y) (x^2 < y) V$
 $b_7) (\exists x)(\exists y) (\exists z) (x+y < z) V$
 $b_8) (\forall x)(\exists y) (\exists z) (x+y < z) V$
 $b_9) (\exists x)(\forall y) (\exists z) (x+y < z) V$
 $b_{10}) (\exists x)(\exists y) (\forall z) (x+y < z) F$
 $b_{11}) (\exists x)(\forall y) (\forall z) (x+y < z) F$
 $b_{12}) (\forall x)(\exists y) (\forall z) (x+y < z) F$
 $b_{13}) (\forall x)(\forall y) (\exists z) (x+y < z) V$

$\exists!$ = existe e \text{e} \text{ \text{u}nico

$(\exists! n \in \mathbb{N})(n < 2)$ verdadeiro

$(\exists! n \in \mathbb{N})(n! < 10)$ Falso

$(\exists! n \in \mathbb{N})(n+1 > n)$ Falso

$(\exists! n \in \mathbb{N})(2n \text{ \text{e} par})$ Falso

Prova-se o quantificador $\exists!$ usando quantificadores universal e existencial.

$$(\exists! x) P(x) \equiv (\exists x) P(x) \wedge (\forall x)(\forall y) (P(x) \wedge P(y) \rightarrow x=y)$$