Prova de Matematica

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1- a)

p	q	$p \to q$	$q \to p$	$(p \to q) \vee (q \to p)$
V	V	V	V	V
V	F	F	V	V
F	V	V	F	V
F	F	V	V	V

b) construindo T.V

p	q	r	$p \vee q$	$p \to r$	$q \vee \sim r$	
F	F	F	F	V	V	
F	F	V	F	V	F	
F	V	F	V	V	V	← C
F	V	V	V	V	V	
V	F	F	V	F	V	
V	F	V	V	V	F	← X .
V	V	F	V	F	V	
V	V	V	V	V	V	

Argumento é invalido

2- a) $P(x)$: se $x^2 < 0$ então $x \geqslant 2$

$r(x) : x^2 < 0$; $q(x) : x \geqslant 2$

$V_P = \emptyset$

b) $Q : (\forall x) P(x)$: Só que $V_r = \emptyset$ e $V_q = \{\mathbb{R} / x \geqslant 2\}$; então $V_r \subseteq V_q$, Pois o conjunto vazio pertence a todos conjuntos.

continuação b) logo, ~~se~~ tera $(\forall x)P(x) = V$

2 - c) $\sim Q : (\exists x)(\sim P(x))$

Alternativa: Existe x nos reais tal que, $x^2<0$ e $x<2$.

3 - $1^3+2^3+3^3+\dots+m^3 = \left[\frac{m(m+1)}{2}\right]^2, m \geq 1$

$m=1$

$1^3=1$

$$\left[\frac{m(m+1)}{2}\right]^2 = \left[\frac{1(1+1)}{2}\right]^2 = 1$$

$P(m) \to P(m+1)$

$$\underbrace{1^3+2^3+3^3+\dots+m^3}+(m+1)^3 =$$

$$\left[\frac{m(m+1)}{2}\right]^2 + (m+1)^3 =$$

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

$$\frac{(m+1)^2.(m^2+4(m+1))}{4} = \frac{(m+1)^2.(m+2)^2}{4} \Rightarrow$$

$$\Rightarrow \left[\frac{(m+1)(m+1+1)}{2}\right]^2$$