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S T Q Q S S D

1)

a) i)  $\neg f \rightarrow 0$

ii)  $0 \rightarrow \neg$

b)  $f \wedge \neg \rightarrow \neg$

2)

a)  $p \rightarrow q \leftrightarrow p \wedge \neg q \rightarrow F$

p	q	$p \rightarrow q \leftrightarrow p \wedge \neg q \rightarrow F$			
V	V	V	V	F	V
V	F	V	F	V	F
F	V	F	V	F	V
F	F	F	V	F	V

b)

$p \leftrightarrow p \wedge q \leftrightarrow p \rightarrow q$

p	q	$\leftrightarrow$	$p \wedge q$	$\leftrightarrow$	$p \rightarrow q$
V	V	V	V	V	V
V	F	F	F	V	F
F	V	V	F	V	V
F	F	V	F	V	V

3)

a)  $m^3 + 5 = 2K + 1$

$m^3 = 2K - 4$

$m^3 = 2(K-2)$

$m^3 = 2j$ , onde  $(K-2)$  está mais inteiro,  $j = K-2$

$m^2 = 2j$ , ou seja,  $m^3$  é um número par.

c.q.d

b)

$p: x^2 + 2x - 3$

$q: x \neq 2$

$p \rightarrow q \leftrightarrow \sim q \rightarrow \sim p$

seja  $x=2$

$2^2 + 2 \cdot 2 - 3 = 4 + 4 - 3 = 5$

Negamos a hipótese.

c.q.d

4)

1)

a)  $\forall x [Carra(x) \rightarrow Perigosa(x)]$

b)  $\forall x [Remedia(x) \rightarrow Saudavel(x)]$

c)  $\forall x [\sim Buena(x) \rightarrow \sim Boa(x)]$

d)  $\sim \exists x [Bebada(x) \rightarrow Feliz(x)]$

e)  $\sim \exists x [Plantas(x) \rightarrow Carnivoras(x)]$



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11)

$$\begin{aligned} a) & \forall x [Cobra(x) \rightarrow Perigosa(x)] \\ & \exists x \sim [Cobra(x) \rightarrow Perigosa(x)] \\ & \exists x \sim [\sim Cobra \vee Perigosa] \\ & \exists x [Cobra \wedge \sim Perigosa] \end{aligned}$$

c. q. d

$$\begin{aligned} b) & \forall x [Remedio(x) \rightarrow Saudavel(x)] \\ & \exists x \sim [Remedio(x) \rightarrow Saudavel(x)] \\ & \exists x \sim [\sim Remedio(x) \vee Saudavel] \\ & \exists x [Remedio \wedge \sim Saudavel] \end{aligned}$$

c. q. d

$$\begin{aligned} c) & \forall x [Bruxa(x) \rightarrow \sim Boa(x)] \\ & \exists x \sim [Bruxa(x) \rightarrow \sim Boa(x)] \\ & \exists x \sim [\sim Bruxa \vee \sim Boa] \\ & \exists x [Bruxa \wedge Boa] \end{aligned}$$

c. q. d

$$\begin{aligned} d) & \sim \exists x [Bebada(x) \rightarrow Feliz(x)] \\ & \exists x \sim [Bebada(x) \rightarrow Feliz(x)] \\ & \exists x \sim [\sim Bebada \vee Feliz] \\ & \exists x [Bebada \wedge \sim Feliz] \end{aligned}$$

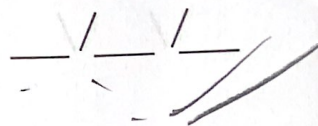
c. q. d

$$\begin{aligned} e) & \exists x [Plantas(x) \rightarrow Carnivoras(x)] \\ & \forall x \sim [Plantas(x) \rightarrow Carnivoras(x)] \\ & \forall x \sim [\sim Plantas(x) \vee Carnivora(x)] \\ & \forall x [Plantas \wedge \sim Carnivoras] \end{aligned}$$

c. q. d

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$$P(n) = n^3 - n \div 3$$

$$P(1) = 1^3 - 1$$

$$P(1) = 0$$

Sabemos que 0 é divisível por 3, vale.

$$P(k) = k^3 - k \div 3$$

$$P(k+1) = (k+1)^3 - (k+1) \div 3$$

$$k^3 + 3k^2 + 3k + 1 - (k+1) \div 3$$

$$k^3 + 3k^2 + 2k \div 3$$

$$k^3 - k + 3(k^2 + k) \div 3$$

C.q.d