Solución Simulacro

2019-09-08

① $(\neg p \wedge (p \to q)) \to \neg q$

p	q	$\neg p$	$p \to q$	$\neg p \wedge (p \to q)$	$\neg q$
0	0	1	1	1	1
0	1	1	1	1	0
1	0	0	0	0	1
1	1	0	1	0	0

No es una tautología

② $(\neg q \wedge (p \to q)) \to \neg p$

- $\neg q$ $\quad \therefore \neg q$
- $p \to q$

- $p \to q \equiv \neg p \vee q$ Eq. 1
- $(\neg q \wedge q) \vee \neg p$ Eq. 10
- $F \vee \neg p$ Identity laws
- $\neg p$ $\square$

③ K: kevin está chateando

h: heather está chateando

R: randy está chateando

V: víctor está chateando

A: abby está chateando

① $(K \vee H) \vee (K \wedge H)$

② $(R \vee V) \wedge \neg(R \wedge V)$

③ $A \to R$

④ $(V \wedge R) \vee (\neg V \wedge \neg R)$

⑤ $H \to (A \wedge K)$

Argumentos:

①

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$$\sum_{i=0}^{n}\left(-\frac{1}{2}\right)^{i} = \frac{2^{n+1}+(-1)^{n}}{3\cdot 2^{n}}$$

Probar que funciona para K

$$\sum_{i=0}^{K}\left(-\frac{1}{2}\right)^{i} = \frac{2^{K+1}+(-1)^{K}}{3\cdot 2^{K}}$$

Probar que funciona para K + 1

$$\sum_{i=0}^{K+1}\left(-\frac{1}{2}\right)^{i} = \frac{2^{K+1}+(-1)^{K}}{3\cdot 2^{K}} + \left(-\frac{1}{2}\right)^{K+1}$$

$$= \frac{2^{K+1}+(-1)^{K}}{3\cdot 2^{K}} - \frac{1^{K+1}}{\underbrace{2^{K+1}}_{2\cdot 2^{K}}}$$

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

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

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

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

$$= \frac{2^{K+2}+(-1)^{K+1}}{3\cdot 2^{K+1}} \quad \square$$

9 $|6| * |10| = \underline{60}$

10 22 jugadores de los que se puede escoger 11

$$\underset{J_1}{\underline{1}} \ \underset{J_2}{\underline{2}} \ \underset{J_3}{\underline{3}} \ \underset{J_4}{\underline{4}} \ \underset{J_5}{\underline{5}} \ \underset{J_6}{\underline{6}} \ \underset{J_7}{\underline{7}} \ \underset{J_8}{\underline{8}} \ \underset{J_9}{\underline{9}} \ \underset{J_{10}}{\underline{10}} \ \underset{J_{11}}{\underline{11}}$$

el orden no importa

$${}^{22}_{11}C = \frac{22!}{(22-11)! \cdot 11!} = \underline{705\,432}$$

11

$$\underset{B_1}{\underline{\quad}} \ \underset{B_2}{\underline{\quad}} \ \underset{B_3}{\underline{\quad}} \ \underset{B_4}{\underline{\quad}} \ \underset{B_5}{\underline{\quad}}$$

a) importa el orden

$${}^{5}_{5}P = \underline{120}$$

$$\underset{B_1}{\underline{P_1}} \ \underset{B_2}{\underline{\quad}} \ \underset{B_3}{\underline{\quad}} \ \underset{B_4}{\underline{\quad}} \ \underset{B_5}{\underline{P_2}}$$

b)

$${}^{3}_{3}P = \underline{6}$$

12 $\{3, 5, 6, 7, 9\}$; quiero agarrar 2 y multiplicarlos

a) ${}^{5}_{2}C = \underline{10}$

b) impares $\{3, 5, 7, 9\}$

pares $\{6\}$

$\therefore \underline{6}$

c) $\frac{\square}{\square}$ $\{3, 5, 6, 7, 9\}$

$${}^{5}_{2}P = \underline{20}$$