

LM ser fácil é condição suficiente
para eu gastar.

$P = \text{LM é fácil}$

$Q = \text{Gosto de LM}$

$$P \rightarrow Q$$

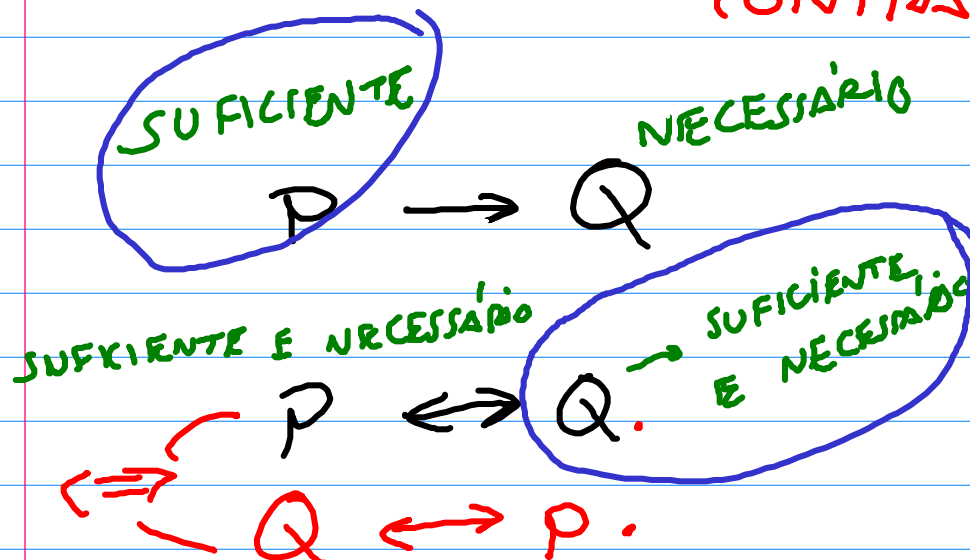
$$P \rightarrow Q \Leftrightarrow \neg Q \rightarrow \neg P$$

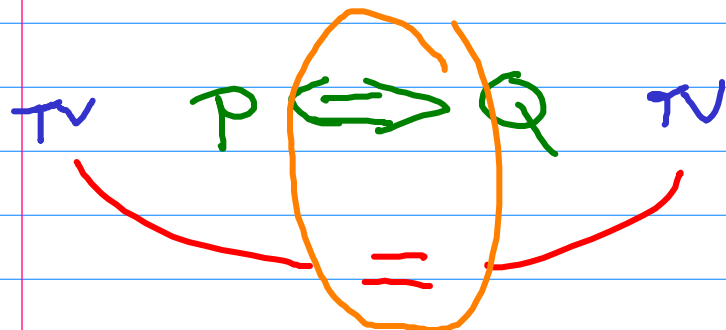
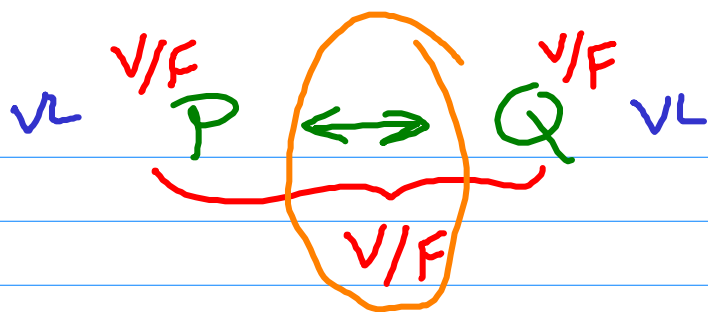
$$\neg P \vee Q \Leftrightarrow$$

$$Q \vee \neg P \Leftrightarrow$$

$$\neg Q \rightarrow \neg P$$

CONTRA-POSITIVA





VÁLIDO OU NÃO VÁLIDO

$$\neg P \leftrightarrow \neg Q.$$

P	Q
V	V
V	F
F	V
F	F

P	Q
V	V
F	F
F	V
V	F

$\neg P$	$\neg P \leftrightarrow Q$
F	F
F	V
V	V
V	F

Diagram showing the relationship between the two tables above, indicating that the second table is the negation of the first table's result: $= \neg$.

$$\neg(P \leftrightarrow Q) \Leftrightarrow (\neg P \leftrightarrow Q)$$

$$\Leftrightarrow (P \leftrightarrow \neg Q)$$

⋮

$$\neg(P \vee Q) \Leftrightarrow \neg P \wedge \neg Q \quad \checkmark$$

$$\neg(P \leftrightarrow Q) \Leftrightarrow \neg P \leftrightarrow Q \quad \checkmark$$

$$a \vee (b \vee c \vee d)$$

$$(P \vee Q) \rightarrow ((P \wedge Q) \vee (P \wedge \neg Q) \vee (\neg P \wedge Q)) \Leftrightarrow$$

$$\neg(P \vee Q) \vee ((P \wedge Q) \vee (P \wedge \neg Q) \vee (\neg P \wedge Q))$$

$$(\neg P \wedge \neg Q) \vee (P \wedge Q) \vee (P \wedge \neg Q) \vee (\neg P \wedge Q) \quad \textcircled{1}$$

$$\left. \begin{array}{l} A \textcircled{\wedge} (B \textcircled{\vee} C) \Leftrightarrow \\ (A \textcircled{\wedge} B) \textcircled{\vee} (A \textcircled{\wedge} C) \end{array} \right\} \begin{array}{l} A \vee (B \wedge C) \Leftrightarrow \\ (A \vee B) \wedge (A \vee C) \end{array}$$

$$[(P \wedge Q) \vee (P \wedge \neg Q)] \vee [(\neg P \wedge Q) \vee (\neg P \wedge \neg Q)]$$

$$\left[\overset{b}{P} \wedge \overset{a}{(Q \vee \neg Q)} \right] \vee \left[\overset{b}{\neg P} \wedge \overset{a}{(Q \vee \neg Q)} \right]$$

$$\underbrace{P \vee \neg P}_{\vee}$$

a	b	a ∧ b
ⓧ V	ⓧ V	→ V
ⓧ V	F	→ F
ⓧ V	ⓧ V	→ V
ⓧ V	F	→ F

P	Q	?
V	V	F
V	F	V
F	V	F
F	F	F

$$P \wedge \neg Q$$

P	Q	?
V	V	V
V	F	F
F	V	F
F	F	V

$$P \leftrightarrow Q$$

$$(P \wedge Q) \vee$$

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

$$P \leftrightarrow Q \Leftrightarrow (P \wedge Q) \vee (\neg P \wedge \neg Q)$$

P	Q	?
V	V	V
V	F	V
F	V	V
F	F	V

$$(P \wedge Q) \vee$$

$$(P \wedge \neg Q) \vee$$

$$(\neg P \wedge Q) \vee$$

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

P	Q	$P \vee Q$	$P \vee Q$	$P \leftrightarrow Q$
V	V	F	V	V
V	F	V	V	F
F	V	V	V	F
F	F	F	F	V

$$\neg(P \leftrightarrow Q) \Leftrightarrow P \vee Q$$

$$\neg P \leftrightarrow Q \Leftrightarrow P \vee Q$$

$$P \vee Q \iff (P \wedge \neg Q) \vee (\neg P \wedge Q)$$

P	Q	P \vee Q
V	V	F
V	F	V
F	V	V
F	F	F

$$(P \wedge \neg Q) \vee (\neg P \wedge Q)$$