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Let L be “the left fork leads to the restaurant”

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The response to the question Q is yes is equivalent to $Q \equiv A$

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Is the statement that the left fork leads to the restaurant equivalent to your being a knight?

Negation

5

$$\neg p \equiv p \equiv \text{false}$$

$$\neg p \equiv (p \equiv \text{false})$$

$$(\neg p \equiv p) \equiv \text{false}$$

Negation

6

$$\neg p \equiv p \equiv \text{false}$$

$$\neg p \equiv (p \equiv \text{false})$$

$$(\neg p \equiv p) \equiv \text{false}$$

$$\neg p \equiv p \equiv q \equiv \neg p \equiv r \equiv \neg q$$

$$\neg p \equiv \neg p \equiv p \equiv q \equiv \neg q \equiv r$$

$$\text{true} \equiv p \equiv \text{false} \equiv r$$

$$p \equiv \neg r$$

There are two natives A and B. A says, “B is a knight is the same as I am a knave.”

What can you determine about A and B?

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8

What can you determine about A and B?

A's statement is: $B \equiv \neg A$

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What can you determine about A and B?

A's statement is: $B \equiv \neg A$

So, we have: $A \equiv B \equiv \neg A$

$$A \equiv \neg A \equiv B$$

$$\text{false} \equiv B$$

$$\neg B$$

$$A?$$

Golden Rule

$$p \wedge q \equiv p \equiv q \equiv p \vee q$$

Implication

$$p \Rightarrow q \equiv p \equiv p \wedge q$$

$$p \Rightarrow q \equiv q \equiv p \vee q$$

If I am a knight, B is a knight

$$A \Rightarrow B$$

If I am a knight, B is a knight

$$A \Rightarrow B$$

$$A \equiv A \Rightarrow B$$

$$A \equiv A \equiv A \wedge B$$

$$A \wedge B$$

Three of the inhabitants – A, B, and C – were standing together in a garden. A stranger passed by and asked A, “Are you a knight or a knave?” A answered but the stranger could not understand. The stranger then asked B, “What did A say?”. B replied, “A said that he is a knave”. At this point, the third C, said, “Don’t believe B; he is lying!”

What are A, B, and C?

B's statement is: $A \equiv \neg A$

B's statement is: $A \equiv \neg A$

C's statement is: $\neg B$

B's statement is: $A \equiv \neg A$

C's statement is: $\neg B$

So, we have:

$$(B \equiv A \equiv \neg A) \wedge (C \equiv \neg B)$$

B's statement is: $A \equiv \neg A$

C's statement is: $\neg B$

So, we have:

$$(B \equiv A \equiv \neg A) \wedge (C \equiv \neg B)$$

$$\neg B \wedge (C \equiv \neg B)$$

$$\neg B \wedge C$$

A says, either I am a knave or B is a knight

A says, either I am a knave or B is a knight

20

$$A \equiv \neg A \vee B$$

$$A \equiv (A \equiv \text{false}) \vee B$$

$$A \equiv (A \vee B \equiv \text{false} \vee B)$$

$$A \equiv A \vee B \equiv B$$

A says, either I am a knave or B is a knight

21

$$A \equiv \neg A \vee B$$

$$A \equiv (A \equiv \text{false}) \vee B$$

$$A \equiv (A \vee B \equiv \text{false} \vee B)$$

$$A \equiv A \vee B \equiv B$$

$$A \wedge B$$