Many logical expressions are equivalent. It can sometimes be advantageous to rewrite an expression using different connectives.

If two expressions have the same truth tables, then they are equivalent. (More complicated expressions can be proved equivalent by using techniques like tableaux or natural deduction.)

Some well-known equivalences are given by theorems like DeMorgan's Law.

DeMorgan's Law states that a negated conjunction is equivalent to a disjunction of negations and that a negated disjunction is equivalent to a conjunction of negations. Whew! Let's unpack that:

- Note that "conjunction" implies "and," while "disjunction" implies "or."
- Therefore, the first part of DeMorgan's Law states that !（a && b） == （!a || !b）
- The second part of DeMorgan's Law states that !（a || b） == （!a && !b）
- (You can show this by making truth tables for the expressions on either side of the == operator.)

Equivalence puzzle

Let's say you have a "mystery operator," notated ※ and with the truth-table given at right. Using only the mystery operator, devise expressions that are equivalent to

a && b, a || b, and !a.

Hint 1: Solve "not" first.
Hint 2: Use DeMorgan's Law