- **Example 1**: Show that $p \to q$ and $\neg p \vee q$ are logically equivalent.

- **Example 2**: Show that $p \vee (q \wedge r)$ and $(p \vee q) \wedge (p \vee r)$ are logically equivalent. This is the *distributive law* of disjunction over conjunction.

- **Example 3**: Show that $\neg(p \to q)$ and $p \wedge \neg q$ are logically equivalent.

- **Example 4**: Show that $p \to q \equiv \neg q \to \neg p$; that is, an implication is logically equivalent to its contrapositive.

1. Equivalent or not?

$(p \wedge q) \rightarrow r$ **vs** $(p \rightarrow r) \wedge (q \rightarrow r)$

2. Prove $(\neg a \rightarrow b) \wedge (\neg b \vee (\neg a \vee \neg b))$ is equivalent to $\neg(a \leftrightarrow b)$, using logical equivalences.