

A more complicated truth table

Consider the expression $[(A \rightarrow B) \wedge \neg B] \rightarrow A$. Is this always true? Sometimes true and sometimes false? Always false? Let's use a truth table to answer this.

| A | B | $(A \rightarrow B) \wedge \neg B$ | $[(A \rightarrow B) \wedge \neg B] \rightarrow A$ |
|-----|-----|-----------------------------------|---|
| T | T | F | T |
| T | F | F | T |
| F | T | F | T |
| F | F | T | F |

So the answer is that it is sometimes true and sometimes false.

Note that we also showed $[(A \rightarrow B) \wedge \neg B] \rightarrow A \equiv A \vee B$.