

February 25, 2019

Biconditional

$$p \leftrightarrow q$$

| p | q | $p \leftrightarrow q$ | $p \rightarrow q$ | \wedge | $q \rightarrow p$ |
|-----|-----|-----------------------|-------------------|----------|-------------------|
| T | T | T | T | T | T |
| T | F | F | F | F | T |
| F | T | F | T | F | F |
| F | F | T | T | T | T |

Logically Equivalent

$$3.3.20 \quad (p \rightarrow \sim q) \leftrightarrow (q \rightarrow \sim p)$$

| p | q | $\sim p$ | $\sim q$ | $(p \rightarrow \sim q)$ | $(q \rightarrow \sim p)$ |
|-----|-----|----------|----------|--------------------------|--------------------------|
| T | T | F | F | F | F |
| T | F | F | T | T | T |
| F | T | T | F | T | T |
| F | F | T | T | T | T |

| $(p \rightarrow \sim q)$ | \rightarrow | $(q \rightarrow \sim p)$ | \wedge | $(q \rightarrow \sim p)$ | \rightarrow | $(p \rightarrow \sim q)$ |
|--------------------------|---------------|--------------------------|----------|--------------------------|---------------|--------------------------|
| F | T | F | T | F | T | F |
| T | T | T | T | T | T | T |
| T | T | T | T | T | T | T |
| T | T | T | T | T | T | T |

$$(p \rightarrow \sim q) \leftrightarrow (q \rightarrow \sim p)$$