Question 22

Show that $p \to q$ and $\neg q \to \neg p$ are logically equivalent.

1. $p \to q \equiv \neg p \lor q$ (Logical Equivalences)
2. $\equiv \neg p \lor \neg\neg q$ (Double Negation Law)
3. $\equiv \neg\neg q \lor \neg p$ (Commutative Law)
4. $\equiv \neg q \to \neg p$ (Logical Equivalences)
5. $\therefore p \to q \equiv \neg q \to \neg p$