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Quiz Week 2 Materials

a) Something is not in the correct place.

b) All tools are in the correct place and are in excellent condition.

c) Nothing is in the correct place and is in excellent condition.

d) One of your tools is not in the correct place, but it is in excellent condition

1a. Something is not in the correct place	$\exists x\ (\sim H(x))$ Something is not in the correct place. So not there exists some item (a tool is not specified) that is not in the correct place.
1b. All tools are in the correct place and area in excellent condition.	$\forall x\ (F(x) \rightarrow H(x)^\wedge S(x))$
1c. Nothing is in the correct place and is in excellent condition.	$\sim\forall x\ (H(x) \wedge S(x))$
1d. One of your tools is not in the correct place but is in excellent condition.	$\exists x(F(x) \rightarrow \sim H(x) \wedge S(x))$

Prove or disprove that $\forall x\ (P(x) \rightarrow Q(x))$ and $\neg \exists x\ \neg(\neg Q(x) \rightarrow \neg P(x))$ are logically equivalent. (Hint: Start with the double negation rule $\neg(\neg \forall x\ (P(x) \rightarrow Q(x)))$)

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