

Math 2534 Practice with Multi-quantifiers

Determine if the following statements are true or false. If false, explain why with an example.

- 1) $(\exists x)(\forall y)Q(x,y) \rightarrow (\forall y)(\exists x)Q(x,y)$ T
- 2) $(\forall y)(\exists x)Q(x,y) \rightarrow (\exists x)(\forall y)Q(x,y)$ F
- 3) $\exists(x)[R(x) \vee S(x)] \rightarrow \exists(x)R(x) \vee \exists(x)S(x)$ T
- 4) $\forall(x)[R(x) \vee S(x)] \rightarrow \forall(x)R(x) \vee \forall(x)S(x)$ F
- 5) $\exists(x)[R(x) \wedge S(x)] \rightarrow \exists(x)R(x) \wedge \exists(x)S(x)$ T
- 6) $\exists(x)R(x) \wedge \exists(x)S(x) \rightarrow \exists(x)[R(x) \wedge S(x)]$ F
- 7) $\forall(x)[R(x) \wedge S(x)] \rightarrow \forall(x)R(x) \wedge \forall(x)S(x)$ T
- 8) $\exists(x)R(x) \vee \exists(x)S(x) \rightarrow \exists(x)[R(x) \vee S(x)]$ T