# AE1MCS: Tutorial 3

Question 1:

1. Use quantifiers to express the statement that “There is a woman who has taken a flight on every airline in the world.”
2. Use quantifiers to express the statement that “There does not exist a woman who has taken a flight on every airline in the world.”

Question 2:

Use rules of inference to show that if $\forall x \left(P(x) \rightarrow \left(Q(\mathrm{x}) \wedge S(x)\right)\right)$ and $\forall x(P(x) \wedge R(x))$ are true, then $\forall x(R(x) \wedge S(x))$ is true.

Question 3:

Use rules of inference to show that if $\forall x(P(x) \vee Q(x))$, $\forall x\big(\neg Q(x) \vee S(x)\big)$, $\forall x\big(R(x) \rightarrow \neg S(x)\big)$, and $\exists x \neg P(x)$ are true, then $\exists x \neg R(x)$ is true.