Lecture 3 (1.4-2.3)

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1.4.3 Negation of Quantified statements

Consider: "Everyone in this room is right handed"
Which in symbols is $\forall x \in$ S, P(x)

S = set of people in room
P(x) is "x is right-handed"
The negation is "Someone in the room is not right-handed" $\exists x \in S$, $\neg P(x)$
Thus, $\neg(\forall x \in S, P(x)) = \exists x \in S, \neg P(x)$
Also since $\neg(\neg P) = P$
$\neg(\exists x \in S), P(x)) = \forall x \in S, \neg P(x)$

Negation of $x^2 - x >= 0$ for all real numbers x (false) is
$x^2 - x < 0$ for some real numbers x (true)
$\neg(\forall x \in \mathbb{R})$