Try it…

What's a possible domain of discourse for these lists of predicates?

1. "x is a cat", "x barks", "x likes to take walks"
2. "x is prime", "x=5" "$x < 20$" "x is a power of two"
3. "x is enrolled in course y", "y is a pre-req for z"

Translations

"For every x, if x is even, then $x = 2$."

"There are x, y such that $x < y$."

$\exists x\ (\texttt{Odd}(x) \wedge \texttt{LessThan}(x, 5))$

$\forall y\ (\text{Even}(y) \wedge \text{Odd}(y))$

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Help me adjust my explanation!

Quantifiers

Writing implications can be tricky when we change the domain of discourse.

For every cat: if the cat is fat, then it is happy.

Domain of Discourse: cats $\forall x[\texttt{Fat}(x) \rightarrow \texttt{Happy}(x)]$

What if we change our domain of discourse to be all mammals?
We need to limit x to be a cat. How do we do that?

$\forall x[(\texttt{Cat}(x) \wedge \texttt{Fat}(x)) \rightarrow \texttt{Happy}(x)]$ $\forall x[\texttt{Cat}(x) \wedge (\texttt{Fat}(x) \rightarrow \texttt{Happy}(x))]$

Universal Quantifier

"$\forall x$"
"for each x", "for every x", "for all x" are common translations
Remember: upside-down-A for All.

Existential Quantifier

"$\exists x$"
"there is an x", "there exists an x", "for some x" are common translations
Remember: backwards-E for Exists.