

More Practice

Let your domain of discourse be fruits. Translate these

There is a fruit that is tasty and ripe.

For every fruit, if it is not ripe then it is not tasty.

There is a fruit that is sliced and diced.

Translation Practice

Domain of Discourse
Food

Predicate Definitions
Fruit(x) := x is a fruit
Tasty(x) := x is tasty
Ripe(x) := x is ripe

Translate these sentences using a natural-sounding translation.

$\exists x(\text{Fruit}(x) \wedge \text{Tasty}(x))$

There is a tasty fruit. OR Some fruits are tasty.

$\forall x((\text{Fruit}(x) \wedge \neg \text{Ripe}(x)) \rightarrow \neg \text{Tasty}(x))$

All fruits that aren't ripe aren't tasty.

DeMorgan's Laws for Quantifiers

$$\neg \forall x P(x) \equiv \exists x \neg P(x)$$

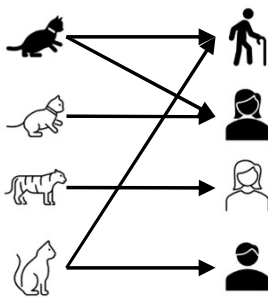
$$\neg \exists x P(x) \equiv \forall x \neg P(x)$$

I.e. to negate an expression with a quantifier:

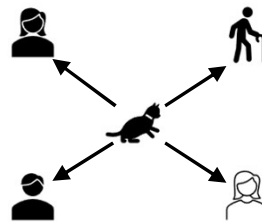
1. Switch the quantifier (\forall becomes \exists , and vice versa).
2. Negate the expression inside.

Try it yourselves

Every cat loves some human.



There is a cat that loves every human.



Let your domain of discourse be mammals.

Use the predicates $\text{Cat}(x)$, $\text{Dog}(x)$, and $\text{Loves}(x, y)$ to mean x loves y .