

321 Section, Week 2

Natalie Linnell

All lions are fierce
Some lions do not drink coffee
Some fierce creatures do not drink coffee

- Translate into logic (provide defs for predicates)

Discussion

All lions are fierce
Some lions do not drink coffee
Some fierce creatures do not drink coffee

- Negate all the statements

All lions are fierce
Some lions do not drink coffee
Some fierce creatures do not drink coffee

•Argue whether the reasoning to conclude the third statement from the first two is so

All hummingbirds are richly colored
No large birds live on honey
Birds that do not live on honey are dull in color
Hummingbirds are small

- Translate into logic (define any predicates used)

All hummingbirds are richly colored
No large birds live on honey
Birds that do not live on honey are dull in color
Hummingbirds are small

- Negate all the statements

All hummingbirds are richly colored
No large birds live on honey
Birds that do not live on honey are dull in color
Hummingbirds are small

- Argue whether the fourth statement follows from the first
3

Show that $\exists xP(x) \wedge \exists xQ(x)$
is not equivalent to $\exists x(P(x) \wedge Q(x))$

- Let $P(x)$ and $Q(x)$ be statements from math or the world to illustrate this.

There is a student in this class who has
been in every room of at least one
building on campus

- Translate into logic (define any predicates)

Every student in this class has been in
at least one room of every building on
campus

- Translate into logic (define any predicates)

$$\exists x \forall y (xy = y)$$

- Domain is real numbers – what concept does this capture?

$$\forall x \forall y (((x < 0) \wedge (y < 0)) \rightarrow (xy > 0))$$

- Domain is real numbers – what concept does this capture?

Everyone has exactly one best friend

- Translate into logic – do not use uniqueness quantifier

It is not sunny this afternoon and it is colder than yesterday
We will go swimming only if it's sunny
If we do not go swimming, then we will take a canoe trip
If we take a canoe trip, then we will be home by sunset

- Show that "We will be home by sunset" follows

Negate

$$\forall x \exists y P(x, y) \vee \forall x \exists y Q(x, y)$$

Negate

$$\forall x \exists y (P(x, y) \rightarrow Q(x, y))$$