321 Section

Natalie Linnell

The importance of domains

- Domain is part of the function definition
- A predicate is a function from some domain to {T,F}
- If P(x) means that x is odd, the domain can't be the real numbers

$$\forall x (P(x) \lor Q(x))$$
$$\forall x P(x) \lor \forall x Q(x)$$

Artificially restricting the domain

- There is someone who has visited every country except for Libya.

$\exists x \; \forall y (\neg InWith(x, Kevin) \land (\neg InWith(x, y) \lor \neg InWith(y, Kevin)))$

- How do you translate this into English?

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

Using constants

- There is someone in the class who speaks Hindi.

HW3, Problem 2

Show that if you pick three socks from a drawer containing just blue socks and black socks, you must get either a pair of blue socks or a pair of black socks.

Existence proofs

(it's ok to just give an example!)

$\exists\, A\, \forall\, B\; Q(A,B)$

$\exists\, B\, \forall\, A\; Q(A,B)$

$Q(A,B)$ iff $A \subseteq B$

Is symmetric difference associative?

What does Fermat's Little Theorem mean?

- $a^{p-1} \bmod p = 1$ if p is prime
- Can I use it to solve the following, and if so what's the answer?
- What's $2^4 \bmod 4$?

- What's $2^3 \bmod 5$?

- What's $2^4 \bmod 5$?

- What's $2^{442} \bmod 5$?

Prove that if m and n are both perfect squares, then nm is a perfect square

- What kind of proof did you do?

Prove that if 3n+2 is odd, then n is odd

- What kind of proof did you do?

Show that the statement "Every positive integer is the sum of the squares of two integers" is false