CSC165 fall 2019
Mathematical expression: predicate logic

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Using Course notes: Mathematical Expression: predicate logic
Outline

back to sets for a minute...

bi-implication etcetera

predicates

quantifiers

multiple quantifiers

mixed quantifiers

negation

number theory intro

notes
sets of sets, etcetera
\( \mathcal{P}(\{a, b, c\}) \)
compare and contrast...

“If it is raining, then I am wearing sneakers.”
“If and only if it is raining, then I am wearing sneakers.”
converse, contrapositive

“If I am wearing sneakers, then it is raining.”
“If I am not wearing sneakers, then it is not raining.”
what’s a predicate?

$n > 7.2$

$x$ is tall
predicate definitions
quantifiers $\forall$ and $\exists$

$n > 7.2$
translate quantified predicates
quantified binary predicates

\[ x + y = 17 \]
mixed quantifier examples
order matters!

\[ x + y = 17 \]
∃: examples
∀: lack of counterexamples
negate quantified predicates
manipulate negation
\( \forall x \in \mathbb{N}, \exists y \in \mathbb{N}, x \geq 5 \lor x^2 - y \geq 30 \)
properties of integers, mostly $\mathbb{N}$
divisibility
primes