

CSC165 fall 2017

Mathematical expression:
predicate logic

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Web page:

<http://www.teach.cs.toronto.edu/~heap/165/F17/>

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Using Course notes: Mathematical Expression: predicate
logic

Outline

bi-implication

predicates

quantifiers

multiple quantifiers

mixed quantifiers

negation

number theory intro

notes

annotated slides



compare and contrast...

“If it rains, then I will wear sneakers.”

“If and only if it rains, then I will wear sneakers.”



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

$$x + y = 17$$



multiple quantifier examples

order matters!

$$x + y = 17$$



$\exists$: examples

$\forall$: lack of counterexamples



negate quantified predicates

manipulate negation

$$\forall x \in \mathbb{N}, \exists y \in \mathbb{N}, x \geq 5 \vee x^2 - y \geq 30$$



properties of integers, mostly $\mathbb{N}$

divisibility



primes



Notes

annotated week 1