# MATH301 Lecture 3

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# 1 disucssion of logical operators

## 1.1 negation

The symbol  or $\neg$ is used to symbolize the concept of negation, that is to say, "not"

$$P: \quad a \wedge b \in \mathbb{Z}$$

negated form

$$\neg P := \neg(a \wedge b) = \neg a \vee \neg b$$

## 1.2 $\forall$

$\forall$ is used to refer to all elements in a set. It is a description used to refer to the entirety of a classification of mathematical objects.

$$\forall n \in \mathbb{Z}$$

$$\neg(\forall x \quad P(X)) = \exists x \neg P(X)$$
$$\neg(\exists x \quad P(X)) = \forall x \neg P(X)$$

## 1.3 $\exists$

This is the existence quentifer which states that an object or relationship exists.