Math 2300
Section 2.3

An **argument** is a sequence of statements, and an **argument form** is a sequence of statement forms. All statements in an argument and all statement forms in an argument form, except for the final one, are called **premises** (or assumptions or hypotheses). The final statement or statement form is called the **conclusion**. The symbol ∴, which is read "therefore," is normally placed just before the conclusion.

To say that an **argument form is valid** means that no matter what particular statements are substituted for the statement variables in its premises, if the resulting premises are all true, then the conclusion is also true. To say that an **argument is valid** means that its form is valid.

If I like Biology, then I will study it.
Either I study Biology or I fail the class.

If I fail the class, then I do not like Biology.

If I stay up late at night, then I will be tired in the morning.
I am not tired this morning.

I did not stay up late last night.

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An argument is called **sound** IFF it is valid *and* all its premises are true.

An argument that is not sound is called **unsound**.

Contradiction rule: If you can show that the supposition that statement *p* is false leads logically to a contradiction, then you can conclude that *p* is true.

Office Hours:

Monday	3:00 – 4:00 pm	DBH 278
Wednesday	12:00 – 1:00 pm	DBH 278
Thursday	2:30 – 3:30 pm	Naraghi 375

and by Appointment
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Some examples:

$x > 0$ or $x < 0$
$x > 0 \rightarrow x^2 > 0$
$x < 0 \rightarrow x^2 > 0$

$x^2 > 0$

If Fido is a dog, then Fido has 4 legs.
Fido has 4 legs.

Fido is a dog.

If Fido is a dog, then Fido has 4 legs.
Fido is not a dog.

Fido does not have 4 legs.

Validity vs. Truth

If Fido is a dog, then Fido is a cat.
Fido is a dog.

Fido is a cat.

If Mahomes plays the whole game, then the Chiefs win.
The Chiefs won.

Mahomes played the whole game.