Take out your homework...

Sections 2.2

Analyzing Conditional Statements

A conditional statement is a logical argument that has two parts, a **hypothesis** and a **conclusion**.

If it is raining, then there are clouds in the sky.

hypothesis (p) conclusion (q)

Writing Statements

Rewrite the conditional statement in if-then form.

a. All students have cell phones.

If you are a student then you have a cell phone.

b. Two angles are supplementary if they are a linear pair.

If they are a linear pair, then 2 angles are supplementary.

c. All birds have feathers.

If it is a bird, then it has feathers.

The ___negation_____ of a statement is the **opposite** of the original statement.

Statement 1 The ball is not red.

Negation 1 The ball is red.

Statement 2 FC Barcelona is the best.

Negation 2 FC Barcelona is not the best.

Statement 3 The cat is not black

Negation 3 The cat is black.

Statement 4 It is snowing

Negation 4 It is not snowing...

Statement
$p \rightarrow q$
If..... Then.....

If there is no heartbeat, then it is dead.

h. c

Inverse
$\sim p \rightarrow \sim q$
Negate both the hypothesis (p) and conclusion (q).

If there is a heartbeat then it is not dead.

Converse
$q \rightarrow p$
Switch the hypothesis (p) and the conclusion (q).

If it is dead, then there is no heartbeat.

Contrapositive
$\sim q \rightarrow \sim p$
Switch & Negate both the hypothesis (p) and conclusion

If it is not dead, then there is a heartbeat.

***Always logically equivalent ***

Statement $p \rightarrow q$

If..... Then.....

Write each statement then determine if it is true or false.

If you are a guitar player, then you are a musician. T

Inverse $\sim p \rightarrow \sim q$

Negate both the hypothesis (p) and conclusion (q). F

If you are not a guitar player, then you are not a musician.

Converse $q \rightarrow p$

Switch the hypothesis (p) and the conclusion (q). F

If you are a musician then you are a guitar player.

Contrapositive $\sim q \rightarrow \sim p$ T

Switch & Negate both the hypothesis (p) and conclusion

If you are not a musician then you are not a guitar player.

***Always logically equivalent ***

Statement $p \rightarrow q$

If..... Then.....

Write each statement then determine if it is true or false.

If 2 lines intersect to form right angles, then they are perpendicular.

Inverse $\sim p \rightarrow \sim q$

Negate both the hypothesis (p) and conclusion (q).

If 2 lines do not intersect to form right angles then they are not perpendicular.

Converse $q \rightarrow p$

Switch the hypothesis (p) and the conclusion (q).

If they are perpendicular then 2 lines intersect to form right angles.

Contrapositive $\sim q \rightarrow \sim p$

Switch & Negate both the hypothesis (p) and conclusion

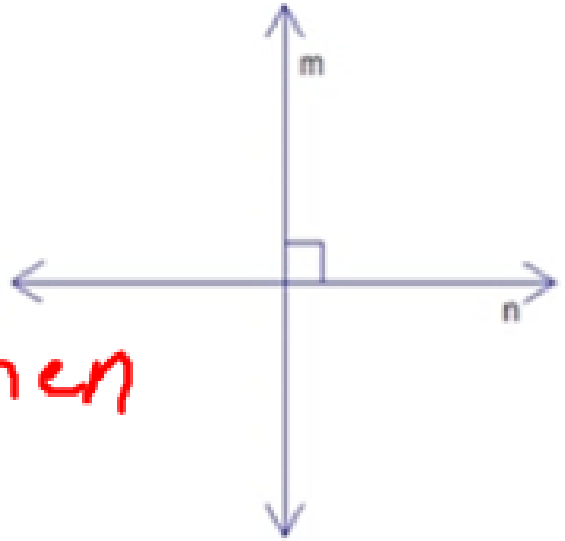
If they are not ⊥ then 2 lines do not intersect to form right angles.

***Always logically equivalent ***

Biconditional statement – when a conditional statement and its converse are both true.
– contains the phrase "if and only if"

Perpendicular Lines

Def – If two lines intersect to form a right angle, then they are perpendicular.



Converse – If they are ⊥, then 2 lines intersect to form right angles.

Ex: Write the definition of perpendicular lines as a biconditional.

$m \perp n$

They are perpendicular if & only if ~~if~~ 2 lines intersect to form right angles.