


# 10&11Sep 1-1

## Logic and Properties

- I can identify the hypothesis and conclusion of a conditional statement.
- Given a biconditional statement, I can write two conditional statements.
- I can write a biconditional statement from 2 conditional statements.
- I can give a counterexample to refute a claim.

# LOGIC CLIP

(Click the paperclip.)

 Logic (2.1).flv

Discussion of logic from clip.

P

A conditional statement ( $p \rightarrow q$ ) has two parts, a hypothesis and a conclusion. When the conditional statement is written in **if-then form**, the 'if' part contains the **hypothesis** (p) and the 'then' part contains the **conclusion**. (q)

$P \rightarrow Q$

Give the Hypothesis and the conclusion of the following statements:

conditional statement

If she is made out of wood, then she is a witch.

P Hypothesis: She is made of wood

Q Conclusion: She is a witch.

$P \rightarrow Q$

If you are a Caveman, then you are awesome.

P Hypothesis: You are a Caveman.

Q Conclusion: You are awesome.

A **biconditional statement** is a statement that contains the phrase "If and only if." or "iff" ( $q \leftrightarrow p$ )

Writing a biconditional statement is equivalent to writing a conditional statement and its converse.

\* Rewrite the biconditional statement as two conditional statements.

1. An animal meows if and only if it is a cat.

$P \rightarrow Q$  If an animal meows, then it is a cat.  
 $Q \rightarrow P$  If it's a cat, then the animal meows.

Conditionals / Statement / Converse

2. It's Friday night if we are having pizza for dinner.

**TRUE**

Bicond is FALSE

Conditional: If Friday night, then pizza dinner

Converse: If pizza dinner, then it's Friday night.

**FALSE Counterexample:**  
 I ate pizza Tuesday.

Rewrite the ~~true~~ statement in two **if-then** form statements.

Then, combine them using if and only if to form a biconditional statement.

Lastly, state whether the biconditional statement is true or false.

1.  $\rightarrow$  Two angles are supplementary <sup>iff</sup> if their sum is  $180^\circ$ .

Cond: If two angles are supp.  $\rightarrow$  then their sum is  $180^\circ$

Conv: If their sum is  $180^\circ$  then the angles are supp

Bicond: Two angles are supplementary iff their sum is  $180^\circ$

T/F? **TRUE**

2. An angle that measures  $30^\circ$  is an acute angle.

Conditional: If an angle measures  $30^\circ$ , then it is an acute angle ✓  
 $P \rightarrow Q$

Converse: If acute, then measures  $30^\circ$  ✗  
 $Q \rightarrow P$

Bic: An angle measures  $30^\circ$  iff it is an acute angle ✗  
 $P \leftrightarrow Q$

Counterexamples:  $60^\circ$ ,  $20^\circ$

$P \rightarrow Q$

What is the conclusion of the following hypotheses, creating a

Conditional Statements

1. If the sum of the measures of the interior angles is  $180^\circ$ ,

then it is a triangle

(what kind of polygon is it?)

2. If the sum of two interior angles in a triangle is  $90^\circ$ , then

the 3<sup>rd</sup> angle is  $90^\circ$

(what is the measurement of the third angle?)

3. If two side-lengths of a triangle are congruent, then

isosceles and base angles are  $\cong$

(what do we know about two of the angles? or, what kind of triangle is it?)

**Is the biconditional statement of these conditional statements true?**

1. If the sum of the measures of the interior angles is  $180^\circ$ ,  
then **it is a triangle.**

2. If the sum of two interior angles in a triangle is  $90^\circ$ , then **the third angle measures  $90^\circ$**

3. If two side-lengths of a triangle are congruent, then **two angles are congruent.**

(or)

3. If two side-lengths of a triangle are congruent, then **it is an isosceles triangle.**

Let's get you so you can finish your green homework by considering this conditional statement.

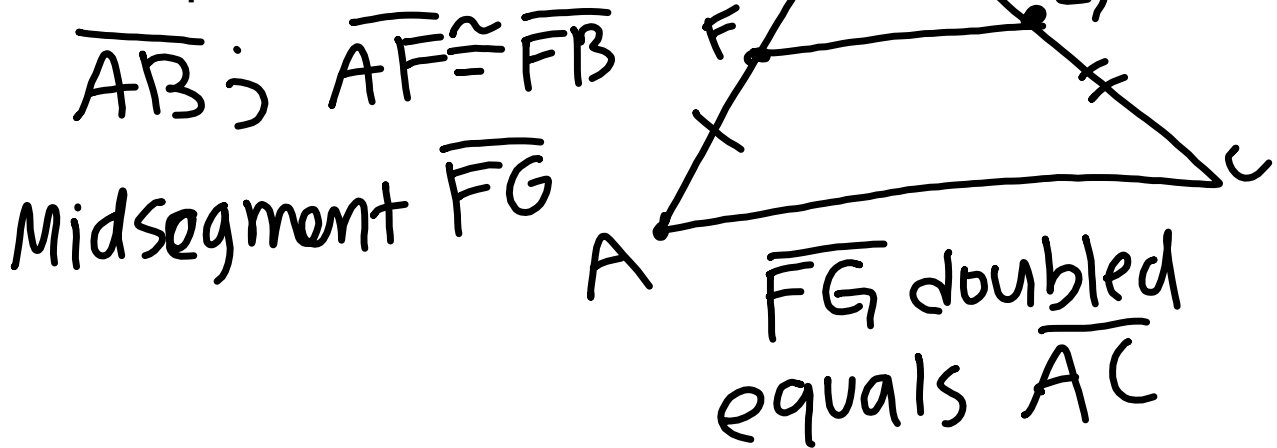
Middle
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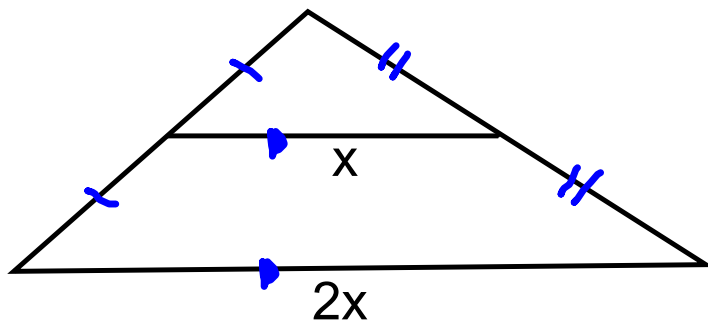
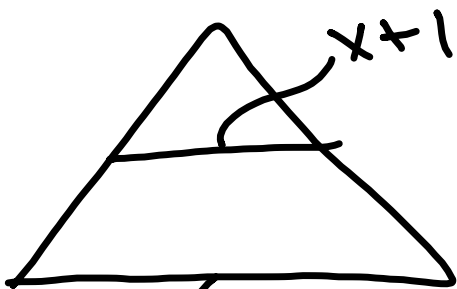
If a triangle has a midsegment connecting the midpoint of two sides of a triangle, then it is  $\parallel$  to the third side of the triangle and half as long.

Draw a picture labeled as described.





Let's try #15 in your HW!!!



$$x+5 \quad 2(x+1) = x+5$$

Decide if the statements are True or False.  
If False, give a counterexample.

1. All living things need water.
2. Everyone in movies can act.
3. No new computer has a floppy disk drive.
4. Everyone has an Instagram.