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.

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)

Conditional Statement

Give the Hypothesis and the conclusion of the following statements:

P Q

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

Hypothesis: She is made out of wood

Conclusion: She is a witch

If you are a Caveman, then you are awesome.

Hypothesis: You are a caveman.

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→Q If an animal meows, then it is a cat
Q→P If it is a cat, then the animal meows

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

P→Q Q→P Not true

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. Two angles are supplementary if their sum is 180°.

P iff Q

P → Q Conditional: If two angles are supplementary, then their sum is 180°

Q → P Converse: If their sum is 180°, then they are supple. TRUE

P ↔ Q biconditional

2. An angle that measures 30° is an acute angle.

#1 P ↔ Q Two angles are supp. iff their sum is 180°

P (hypothesis)

An angle that measures 30° is an acute angle Q (conclusion)

P→Q Conditional Statement

If an angle measures 30°, then it is an acute angle.

Q→P Converse

If it's acute, then the angle measures 30°

$P \leftrightarrow Q$ Biconditional Statement

An angle measures 30° iff it is an acute angle.

Not true

P→Q Q→P converse

What is the conclusion of the following hypotheses, creating a conditional statement

1. If the sum of the measures of the interior angles is 180°,

then it is a triangle

(*what kind of polygon is it?)*

2. If the sum of two interior angles in a triangle is 90°, then

the third angle = 90°

(*what is the measurement of the third angle?)*

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

it's isosceles & angles ≅.

(*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°,

then **it is a triangle.**

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

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

(or)

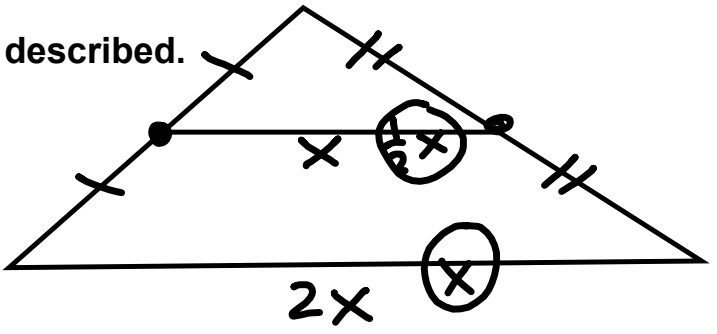
3. If two side-lengths of a triangle are congruent, then **it is an isosceles triangle.**

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

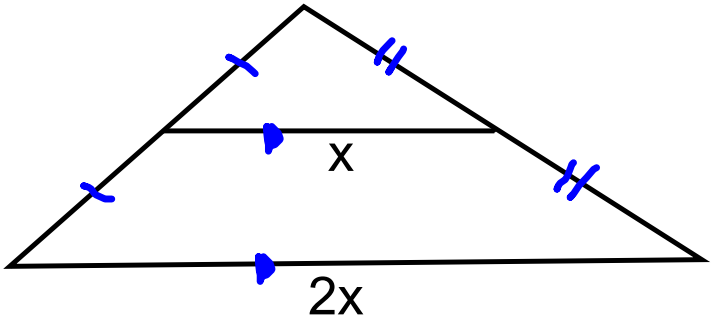
Middle Middle

If a triangle has a *midsegment* connecting the midpoint of two sides of a triangle, then it is || to the third side of the triangle and half as long.

Draw a picture labeled as described.



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



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.