

The **hypothesis** is what you are assuming is true  
(It generally follows the "if" part of the statement)

The **conclusion** states what you need to prove  
(It generally follows the "then" part of the statement)

Launch:

Consider these statements:

- \* If tomorrow is Monday, then yesterday was Saturday
- \* Vertical angles are congruent.
- \* If you have a  $104^\circ$  temperature, you have a fever.
- \* If it is not sunny, then it is raining.

These statements are either true or false.  
They have a *hypothesis* and a *conclusion*.

**2.11 Analyzing the Statement to Prove**

Objective: Students write if-then statements to recognize the hypothesis and conclusion.

**EXPLORE:**

1. Determine which of the following if/then statements are true.

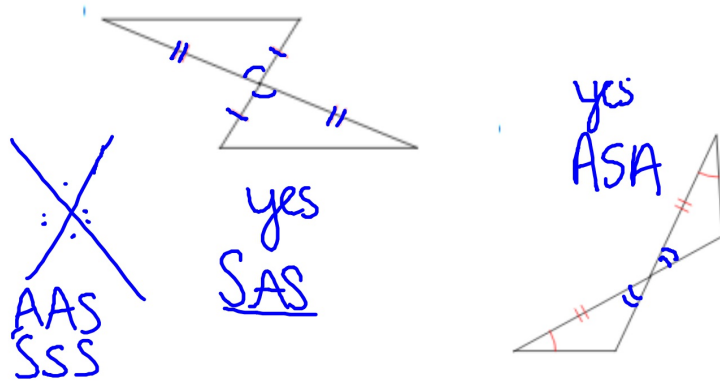
Sentence	Hypothesis	Conclusion
If two parallel lines are cut by a transversal, the alternate interior angles are congruent.	Two parallel lines are cut by a transversal.	The alternate interior angles are congruent.
The base angles of an isosceles triangle are congruent.	Two angles are base angles of an isosceles triangle.	These two angles are congruent.
Two triangles with the same area are congruent.	Two triangles have the same area.	The two triangles are congruent.
Congruent triangles have the same area.	Two triangles are congruent.	They have the same area.
People with large hands have large feet.	Certain people have large hands.	These people have large feet.
Out of sight, out of mind.	Something is out of sight.	It is also out of mind.

2. In each sentence below, identify the hypothesis and conclusion.

- a. If two lines form congruent alternate interior angles with a transversal, then the lines are parallel.
- b. If  $n$  is any whole number,  $n^2 + n + 41$  is prime.
- c. Two triangles are congruent if three sides of one triangle are congruent to three sides of the other triangle.
- d. Two lines that are parallel to a third line are also parallel to each other.

MDI -

Is there enough info to prove the triangles are congruent?  
If so, which postulate or theorem proves their congruence?



## 2.11 Analyzing the Statement to Prove

DAY 2!

Objective: Students write if-then statements to recognize the hypothesis and conclusion.

**converse** - switches the hypothesis and the conclusion

EXAMPLE 1:

Write the converse.

a) If two lines intersect to form right angles, then they are perpendicular.

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

b) If a figure is a square, then it has four sides.

If a figure has four sides, then it is a square.

original conditional: true

converse: false.

(a counterexample is any rectangle)

**biconditional** - when a conditional and its converse are true (if and only if)

**Example 2:**

Write its converse. If the converse is also true, combine the statement as a biconditional

a) If two angles have the same measure, then the angles are congruent.

Converse: If two angles are congruent, then the angles have the same measure.

Biconditional: Two angles have the same measure if and only if the angles are congruent.

**SUMMARY: (BIG IDEAS FOR TODAY)**

Statements that we must prove have a *hypothesis* and a *conclusion*

**AND**

Just because a statement has a conclusion, it does not mean that the statement is true.

**EXIT TICKET:**

If you have  $104^\circ$  temperature, then you have a fever.

- Write the statement, single underline the hypothesis and double underline the conclusion.
- Write the converse of the statement
- Determine if the original and converse are true.
- If both are true, write as a biconditional (if and only if) If false, provide a counterexample.

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4-9: Write an if-then statement for each. Write the converse. Decide if you think each is true or false. If both true, write a biconditional

**Homework: Page 124: 3-9**

**Recall vocabulary:**  
perpendicular,  
bisect,  
equilateral,  
equiangular

4-9: Write an if-then statement for each. Write the converse. Decide if you think each is true or false. If both true, write a biconditional

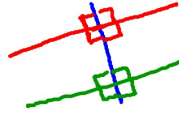
## Page 124: 3-9

4-9: Write an if-then statement for each.

Write the converse. Decide if you think each is true or false. If both true, write a biconditional

3. **Standardized Test Prep** Which is the hypothesis of the following statement? If two angles are congruent, then they have the same measure.

- A. Two angles are congruent.      B. They have the same measure.  
C. Two angles are not congruent.      D. They do not have the same measure.



For Exercises 4-9, draw a picture that illustrates the hypothesis. Then determine whether the statement is true. If a statement is true, give a proof. If a statement is not true, give a counterexample.

4. Two lines that are perpendicular to the same line are parallel to each other.  
5. A line that bisects an angle of a triangle also bisects the side that is opposite the angle.  
6. Equilateral quadrilaterals are **equiangular**.  
7. If a triangle has two congruent angles, it is isosceles.  
8. Equiangular triangles are equilateral.  
9. Equiangular quadrilaterals are equilateral.

