Conditional Statements Practice

First, write the conditional statement in if-then form. Then, determine the hypothesis and conclusion of each conditional statement.

1. If it is Saturday, there is no school.
   If-then form: If it is Saturday, then there is no school.
   Hypothesis: It is Saturday.
   Conclusion: There is no school.

2. Pass in your test if you are finished.
   If-then form: If you are finished, then pass in your test.
   Hypothesis: You are finished.
   Conclusion: Pass in your test.

3. No one in this class likes backgammon.
   If-then form: If you are in this class, then you do not like backgammon.
   Hypothesis: You are in this class.
   Conclusion: You do not like backgammon.

4. Every square is a rectangle.
   If-then form: If a shape is a square, then it is a rectangle.
   Hypothesis: A shape is a square.
   Conclusion: It is a rectangle.
**Related Conditional Statements:** Every conditional statement involves two scenarios (hypothesis and conclusion). Switching and/or negating these scenarios creates three related conditional statements (converse, inverse, and contrapositive).

Ex.  
Original Statement: If a being is a monkey, then it loves bananas.  
Converse: If a being loves bananas, then it is a monkey.

Original Statement: If a being is a monkey, then it loves bananas.  
*Inverse: If a being is not a monkey, then it does not love bananas.

Original Statement: If a being is a monkey, then it loves bananas.  
*Contrapositive: If a being does not love bananas, then it is not a monkey.

Practice: Write the **converse**, **inverse**, and **contrapositive** of each conditional statement. Then determine (using your own knowledge of the world) whether each statement is **true** or **false**.

5. If a person lives in Salem, NH, then they live in the USA.  
Converse: If a person lives in the USA, then they live in Salem, NH. *(false)*

*Inverse: If a person does not live in Salem, NH, then they do not live in the USA. *(false)*

*Contrapositive: If a person does not live in the USA, then they do not live in Salem, NH. *(true)*

6. If an angle is right, then its measure is 90°.  
Converse: If an angle's measure is 90°, then it is right. *(true)*

*Inverse: If an angle is not right, then its measure is not 90°. *(true)*

*Contrapositive: If an angle's measure is not 90°, then it is not right. *(true)*

7. If a polygon is regular, then its sides are congruent.  
Converse: If a polygon's sides are congruent, then it is regular. *(false)*

*Inverse: If a polygon is not regular, then its sides are not congruent. *(false)*

*Contrapositive: If a polygon's sides are not congruent, then it is not regular. *(true)*

**Biconditional Statements:** A statement in which ALL of its related conditional statements are true.

We write biconditional statements in **if and only if form** (aka **iff form**).

Ex.  
Original Statement: A triangle is right iff one of its angles has a measure of 90°.

True Statements:
If a triangle is right, then one of its angles has a measure of 90°.
If a triangle is not right, then one of its angles does not have a measure of 90°.
If one of the angles in a triangle has a measure of 90°, then the triangle is right.
If one of the angles in a triangle does not have a measure of 90°, then the triangle is not right.

8. Are any of the above statements **biconditional statements**? If so, rewrite them in **iff form**.  
Yes... #6: An angle is right iff its measure is 90°.