

2-3**Study Guide and Intervention**

Notes

Conditional Statements

If-then Statements An if-then statement is a statement such as "If you are reading this page, then you are studying math." A statement that can be written in if-then form is called a **conditional statement**. The phrase immediately following the word *if* is the **hypothesis**. The phrase immediately following the word *then* is the **conclusion**.

A conditional statement can be represented in symbols as $p \rightarrow q$, which is read " p implies q " or "if p , then q ."

Example 1

Identify the hypothesis and conclusion of the statement.

If $\angle X \cong \angle R$ and $\angle R \cong \angle S$, then $\angle X \cong \angle S$.

hypothesis

conclusion

Example 2

Identify the hypothesis and conclusion.

Write the statement in if-then form.

You receive a free pizza with 12 coupons.

If you have 12 coupons, then you receive a free pizza.

hypothesis

conclusion

Exercises

Identify the hypothesis and conclusion of each statement.

- If it is Saturday, then there is no school.
H C
- If $x - 8 = 32$, then $x = 40$.
H C
- If a polygon has four right angles, then the polygon is a rectangle.
H C

Write each statement in if-then form.

4. All apes love bananas.

If you're an Ape, then you love bananas.

5. The sum of the measures of complementary angles is 90.

IF THE MEASURES ~~IS~~ ^{ARE} COMPLEMENTARY, THEN THE SUM IS 90.

6. Collinear points lie on the same line.

if the points lie on the same line, then they are collinear

Determine the truth value of the following statement for each set of conditions.

If it does not rain this Saturday, we will have a picnic.

7. It rains this Saturday, and we have a picnic. *False*

8. It rains this Saturday, and we don't have a picnic. *True*

9. It doesn't rain this Saturday, and we have a picnic. *True*

10. It doesn't rain this Saturday, and we don't have a picnic. *False*

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Study Guide and Intervention (continued)

Conditional Statements

Converse, Inverse, and Contrapositive If you change the hypothesis or conclusion of a conditional statement, you form a **related conditional**. This chart shows the three related conditionals, *converse*, *inverse*, and *contrapositive*, and how they are related to a conditional statement.

	Symbols	Formed by	Example
Conditional	$p \rightarrow q$	using the given hypothesis and conclusion	If two angles are vertical angles, then they are congruent.
Converse	$q \rightarrow p$	exchanging the hypothesis and conclusion	If two angles are congruent, then they are vertical angles.
Inverse	$\sim p \rightarrow \sim q$	replacing the hypothesis with its negation and replacing the conclusion with its negation	If two angles are not vertical angles, then they are not congruent.
Contrapositive	$\sim q \rightarrow \sim p$	negating the hypothesis, negating the conclusion, and switching them	If two angles are not congruent, then they are not vertical angles.

Just as a conditional statement can be true or false, the related conditionals also can be true or false. A conditional statement always has the same truth value as its contrapositive, and the converse and inverse always have the same truth value.

Exercises

Write the converse, inverse, and contrapositive of each conditional statement. Tell which statements are *true* and which statements are *false*.

1. If you live in San Diego, then you live in California. T

Converse: If you live in California, then you live in San Diego. F

Inverse: If you do not live in San Diego, then you don't live in California. F

Contrapositive: If you do not live in California, then you do not live in San Diego. T

2. If a polygon is a rectangle, then it is a square. F

Converse: If it is a square, then the polygon is a rectangle. T

Inverse: If a polygon is NOT a rectangle, then it's NOT a square. T

Contrapositive: If it's NOT a square, then the polygon is NOT a rectangle. F

3. If two angles are complementary, then the sum of their measures is 90.

Converse: If the sum of the angles measure is 90, then the 2 angles are complementary.

Inverse: If 2 angles are not complementary, then there sum is not 90°.

Contrapositive: If the sum of measures is not 90°, then the two angles are not complementary.

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