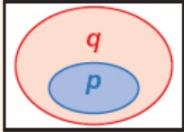


Lesson 2-2

Conditional Statements Day 1

Conditional Statements

DEFINITION	SYMBOLS	VENN DIAGRAM
A conditional statement is a statement that can be written in the form "if p , then q ."	$p \rightarrow q$	
The hypothesis is the part p of a conditional statement following the word <i>if</i> .		
The conclusion is the part q of a conditional statement following the word <i>then</i> .		

By phrasing a conjecture as an if-then statement, you can quickly identify its hypothesis and conclusion.

$$p \rightarrow q$$

Writing Math

"If p , then q " can also be written as "if p , q ,"
" q , if p ," " p implies q ," and " p only if q ."

if P then Q

IF P , Q

Q if P

P implies Q

~~P~~ P only if Q $P \rightarrow Q$

Example 1: Identifying the Parts of a Conditional Statement

Identify the hypothesis and conclusion of each conditional.

A. If today is Thanksgiving Day, then today is Thursday.

Hypothesis: Today is Thanksgiving Day.

Conclusion: Today is Thursday.

B. A number is a rational number if it is an integer.

Hypothesis: A number is an integer.

Conclusion: The number is a rational number.

Check It Out! Example 1

Identify the hypothesis and conclusion of the statement.

"A number is divisible by 3 if it is divisible by 6."

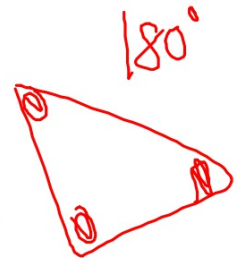
~~H~~ypothesis: A number is divisible by 6.

~~C~~onclusion: A number is divisible by 3.

Example 2A: Writing a Conditional Statement

Write a conditional statement from the following.

An obtuse triangle has exactly one obtuse angle.



An obtuse triangle
has exactly one obtuse angle.

*Identify the
hypothesis and the
conclusion.*

{ If a triangle is obtuse, then it has exactly one obtuse angle.

Check It Out! Example 2

Write a conditional statement from the sentence "Two angles that are complementary are acute."

Two angles that are complementary are acute.

Identify the hypothesis and the conclusion.

If two angles are complementary, then they are acute.

Example 3A: Analyzing the Truth Value of a Conditional Statement

Determine if the conditional is true. If false, give a counterexample.

If this month is August, then next month is September.

When the hypothesis is true, the conclusion is also true because September follows August. So the conditional is true.

Example 3B: Analyzing the Truth Value of a Conditional Statement

Determine if the conditional is true. If false, give a counterexample.

If two angles are acute, then they are congruent.

You can have acute angles with measures of 80° and 30° . In this case, the hypothesis is true, but the conclusion is false.

Since you can find a counterexample, the conditional is false.

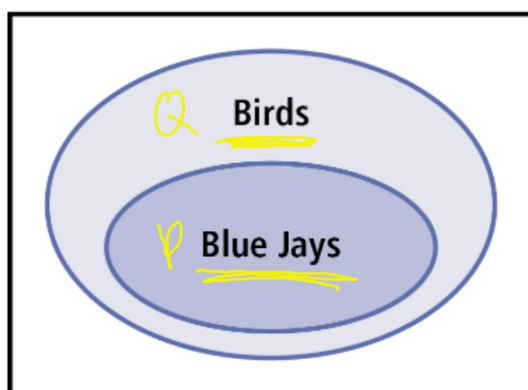
Check It Out! Example 3

Determine if the conditional “If a number is odd, then it is divisible by 3” is true. If false, give a counterexample.

An example of an odd number is 7. It is not divisible by 3. In this case, the hypothesis is true, but the conclusion is false. Since you can find a counterexample, the conditional is false.

Example 2B: Writing a Conditional Statement

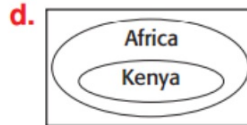
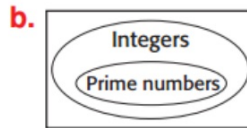
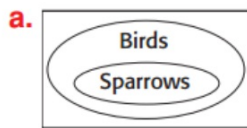
Write a conditional statement from the following.



If an animal is a blue jay, then it is a bird.

The **inner** oval represents the **hypothesis**, and the **outer** oval represents the **conclusion**.

1. Write an if-then statement based on each Venn diagram.



Create a Venn diagram for the conditional

If angles are supplementary, then their sum is 180 degrees.



Create a Venn diagram for the conditional

Good students do their homework

3. **Explain** how to write an if-then statement based on a Venn diagram.
4. **Describe** how an if-then statement might be used in an advertisement.

The **negation** of statement p is "not p ," written as $\sim p$. The negation of a true statement is false, and the negation of a false statement is true.

p
 $\sim p$

Shade the region in the Venn diagram that represents each statement. Part A is already filled in as an example.

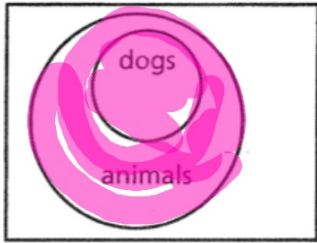
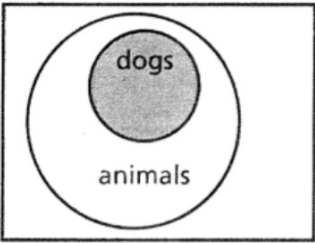
All dogs are animals. If an object is a dog, then it is an animal.

p

q

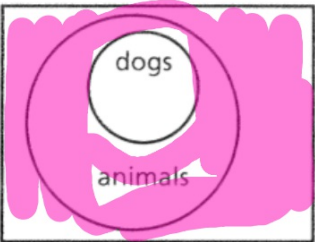
A p

B q



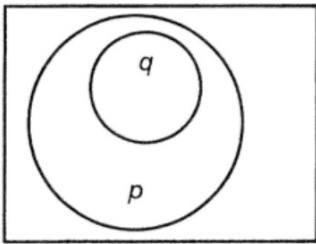
C $\sim p$

D $\sim q$



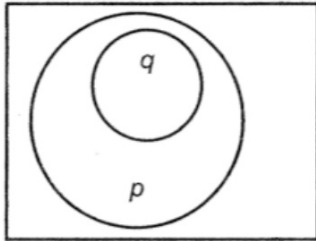
Four Venn diagrams related to $q \rightarrow p$ are shown. Shade the region that represents each statement.

1. q



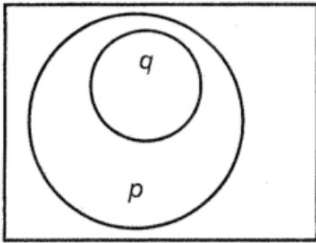
Four Venn diagrams related to $q \rightarrow p$ are shown. Shade the region that represents each statement.

2. p



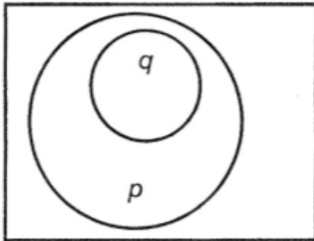
Four Venn diagrams related to $q \rightarrow p$ are shown. Shade the region that represents each statement.

3. $\sim q$



Four Venn diagrams related to $q \rightarrow p$ are shown. Shade the region that represents each statement.

4. $\sim p$



Lesson Quiz: Part I

Identify the hypothesis and conclusion of each conditional.

- 1.** A triangle with one right angle is a right triangle.
- 2.** All even numbers are divisible by 2.
- 3.** Determine if the statement "If $n^2 = 144$, then $n = 12$ " is true. If false, give a counterexample.

Vocabulary Apply the vocabulary from this lesson to answer each question

1. The ? of a *conditional statement* is formed by exchanging the hypothesis and conclusion. (*converse, inverse, or contrapositive*)
2. A *conditional* and its *contrapositive* are ? because they have the same value. (*logically equivalent or converses*)

Identify the hypothesis and conclusion of each conditional.

3. If a person is at least 16 years old, then the person can drive a car.
4. A figure is a parallelogram if it is a rectangle.
5. The statement $a - b < a$ implies that b is a positive number.

Write a conditional statement from each of the following.

6. Eighteen-year-olds are eligible to vote.

8.



PRACTICE AND PROBLEM SOLVING

Identify the hypothesis and conclusion of each conditional.

13. If an animal is a tabby, then it is a cat.
14. Four angles are formed if two lines intersect.
15. If 8 ounces of cereal cost \$2.99, then 16 ounces of cereal cost \$5.98.

Write a conditional statement from each sentence.

16. You should monitor the heart rate of a patient who is ill.
17. After three strikes, the batter is out.
18. Congruent segments have equal measures.

Determine if each conditional is true. If false, give a counterexample.

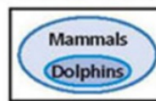
19. If you subtract -2 from -6 , then the result is -4 .
20. If two planes intersect, then they intersect in exactly one point.

Draw a Venn diagram.

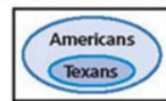
30. All integers are rational numbers.
32. All rectangles are quadrilaterals.
31. All natural numbers are real.
33. Plane is an undefined term.

Write a conditional statement from each Venn diagram.

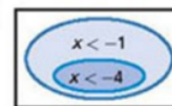
34.



35.



36.



HW 2.2a

p84-85

#1-6, 8, 13-20,

30-36

