

# Reteaching 2-2

## Biconditionals and Definitions

**OBJECTIVE:** Writing biconditional statements and identifying good definitions

**MATERIALS:** None

### Example 1

Consider the true statement given below. Write its converse. If the converse is also true, combine the statements as a biconditional.

*Conditional:* If a pentagon has five equal sides, then it is an equilateral pentagon.

*Converse:* If a pentagon is an equilateral pentagon, then it has five equal sides.

The converse is true, so the two statements can be written as one biconditional.

*Biconditional:* A pentagon is an equilateral pentagon if and only if it has five equal sides.

### Example 2

Show that this definition of isosceles triangle is a good definition. Then write it as a true biconditional. *An isosceles triangle has two sides of equal length.*

*Conditional:* If a triangle has two sides of equal length, then it is an isosceles triangle.

*Converse:* If a triangle is isosceles, then it has two sides of equal length.

Because the two conditionals are true, this is a good definition and can be rewritten as a biconditional.

*Biconditional:* A triangle is an isosceles triangle if and only if two sides are of equal length.

### Exercises

**Write the two conditional statements that make up each biconditional.**

- $|n| = 15$  if and only if  $n = 15$  or  $n = -15$ .
- Two segments are congruent if and only if they have the same measure.
- You live in California if and only if you live in the most populated state in the United States.
- An integer is a multiple of 10 if and only if the last digit is 0.

**If the statement is a good definition, write it as a biconditional. If not, find a counterexample.**

- An elephant is a large animal.
- Two planes intersect at a line.
- An even number is a number that ends in 0, 2, 4, 6, or 8.
- A triangle is a three-sided figure whose angle measures sum to  $180^\circ$ .