**INVESTIGATION #1**

1. Examine the four sets of conditionals below.
2. Determine the truth value of the original conditional and the new conditional.
3. Identify what changes took place to create the new conditional and apply those changes to the two examples at the bottom of the page. Determine the truth value of each.

Set #1:

**Original Conditional**: If a shape has four sides, then it is a rectangle.

**New Conditional**: If a shape is a rectangle, then it has four sides.

Set #2:

**Original Conditional**: If a polygon is a square, then it does not have three sides.

**New Conditional**: If a polygon does not have three sides, then it is a square.

Set #3:

**Original Conditional**: If two lines do not intersect, then they are parallel.

**New Conditional**: If two lines are parallel, then they do not intersect.

Set #4:

**Original Conditional**: If 1 + 1 = 3, then 2 + 2 = 5.

**New Conditional**: If 2 + 2 = 5, then 1 + 1 = 3.

EXAMPLE #1: If two parallel lines are cut by a transversal, then the alternate interior angles are congruent.

EXAMPLE #2: If a shape is reflected over a line, then the orientation of the shape changes.

**INVESTIGATION #2**

1. Examine the four sets of conditionals below.
2. Determine the truth value of the original conditional and the new conditional.
3. Determine what changes took place to create the new conditional and apply those changes to the two examples at the bottom of the page. Determine the truth value of each.

Set #1:

**Original Conditional**: If a shape has four sides, then it is a rectangle.

**New Conditional**: If a shape does not have four sides, then it is not a rectangle.

Set #2:

**Original Conditional**: If a polygon is a square, then it does not have three sides.

**New Conditional**: If a polygon is not a square, then it does have three sides.

Set #3:

**Original Conditional**: If two lines do not intersect, then they are parallel.

**New Conditional**: If two lines do intersect, then they are not parallel.

Set #4:

**Original Conditional**: If 1 + 1 = 3, then 2 + 2 = 5.

**New Conditional**: If 1 + 1 $\ne $ 3, then 2 + 2 $\ne $ 5.

EXAMPLE #1: If two parallel lines are cut by a transversal, then the alternate interior angles are congruent.

EXAMPLE #2: If a shape is reflected over a line, then the orientation of the shape changes.

**INVESTIGATION #3**

1. Examine the four sets of conditionals below.
2. Determine the truth value of the original conditional and the new conditional.
3. Determine what changes took place to create the new conditional and apply those changes to the two examples at the bottom of the page. Determine the truth value of each.

Set #1:

**Original Conditional**: If a shape has four sides, then it is a rectangle.

**New Conditional**: If a shape is not a rectangle, then it does not have four sides.

Set #2:

**Original Conditional**: If a polygon is a square, then it does not have three sides.

**New Conditional**: If a polygon does have three sides, then it is not a square.

Set #3:

**Original Conditional**: If two lines do not intersect, then they are parallel.

**New Conditional**: If two lines are not parallel, then they do intersect.

Set #4:

**Original Conditional**: If 1 + 1 = 3, then 2 + 2 = 5.

**New Conditional**: If 2 + 2 $\ne $ 5, then 1 + 1 $\ne $ 3.

EXAMPLE #1: If two parallel lines are cut by a transversal, then the alternate interior angles are congruent.

EXAMPLE #2: If a shape is reflected over a line, then the orientation of the shape changes.