

# Parent Newsletter

## Chapter 3: Angles and Triangles

### Key Terms

A line that intersects two or more lines is called a **transversal**.

When two parallel lines are cut by a transversal, four **interior angles** are formed on the inside of the parallel lines and four **exterior angles** are formed on the outside of the parallel lines.

The angles inside a polygon are called **interior angles** of the polygon.

The angles outside the polygon that are adjacent to the interior angles are called **exterior angles** of the polygon.

A polygon is **convex** when every line segment connecting any two vertices lies entirely inside the polygon.

A polygon is **concave** when at least one line segment connecting any two vertices lies outside the polygon.

In a **regular polygon**, all the sides are congruent, and all the interior angles are congruent.

**Indirect measurement** uses similar figures to find a missing measure when it is difficult to find directly.

### Students will...

Identify the angles formed when parallel lines are cut by a transversal.

Find the measures of angles formed when parallel lines are cut by a transversal.

Understand that the sum of the interior angle measures of a triangle is  $180^\circ$ .

Find the measures of interior and exterior angles of triangles.

Find the sum of the interior angle measures of polygons.

Understand that the sum of the exterior angle measures of a polygon is  $360^\circ$ .

Find the measures of interior and exterior angles of polygons.

Understand the concept of similar triangles.

Identify similar triangles.

Use indirect measurement to find missing measures.

### Standards

#### Common Core:

**8.G.5:** Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.

### Essential Questions

How can you describe angles formed by parallel lines and transversals?

How can you describe the relationships among the angles of a triangle?

How can you find the sum of the interior angle measures and the sum of the exterior angle measures of a polygon?

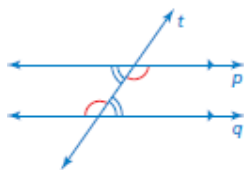
How can you use angles to tell whether triangles are similar?



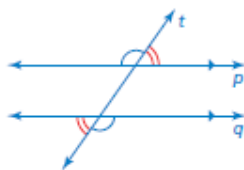
### Key Ideas

#### Alternate Interior Angles and Alternate Exterior Angles

When a transversal intersects parallel lines, alternate interior angles are congruent and alternate exterior angles are congruent.



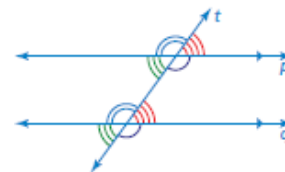
Alternate interior angles



Alternate exterior angles

#### Corresponding Angles

When a transversal intersects parallel lines, corresponding angles are congruent.







Corresponding angles

#### Interior Angle Measures of a Polygon

- The sum  $S$  of the interior angle measures of a polygon with  $n$  sides is  $S = (n - 2) \cdot 180^\circ$ .

## Reference Tools

### Transversals

Examples	Non-Examples
 <p>line p line q line r</p>	 <p>line a line b line c</p>
 <p>line a line b line c line d</p>	 <p>line p line t</p>

An **Example and Non-Example Chart** can be used to list examples and non-examples of a vocabulary word or term. Write examples of the word or term in the left column and non-examples in the right column. This type of organizer serves as a good tool for assessing knowledge of pairs of topics that have subtle but important differences, such as complementary and supplementary angles.

## Games

- Picture This

This is available online in the *Game Closet* at [www.bigideasmath.com](http://www.bigideasmath.com).

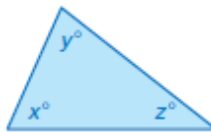
## Quick Review

- Lines in the same plane that do not intersect are called *parallel lines*.
- Lines that intersect at right angles are called *perpendicular lines*.
- When parallel lines are cut by a transversal, several pairs of congruent angles are formed.
- Corresponding angles lie on the same side of the transversal in corresponding positions.
- Alternate interior angles and alternate exterior angles lie on opposite sides of the transversal.
- A *polygon* is a closed plane figure made up of three or more line segments that intersect only at their endpoints.
- For polygons whose names you don't know, you can use the phrase "*n*-gon," where *n* is the number of sides.

## GO Key Ideas

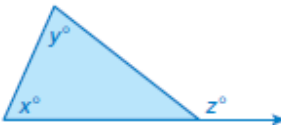
### Interior Angle Measures of a Triangle

- The sum of the interior angle measures of a triangle is  $180^\circ$ .
- $x + y + z = 180$



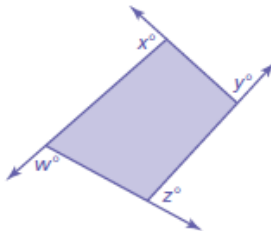
### Exterior Angle Measures of a Triangle

- The measure of an exterior angle of a triangle is equal to the sum of the measures of the two nonadjacent interior angles.
- $z = x + y$



### Exterior Angle Measures of a Polygon

- The sum of the measures of the exterior angles of a convex polygon is  $360^\circ$ .
- $w + x + y + z = 360$



### Angles of Similar Triangles

- When two angles in one triangle are congruent to two angles in another triangle, the third angles are also congruent and the triangles are similar.

## What's the Point?

The ability to work with angles and triangles is very useful in real life for events like building a staircase. Have your student measure the individual stairs at their house or school. What do they notice about the angles? Are they similar? What would happen if they were different?

The STEM Videos available online show ways to use mathematics in real-life situations. The Chapter 3: Honeycombs STEM Video is available online at [www.bigideasmath.com](http://www.bigideasmath.com).

