Lesson 12.1
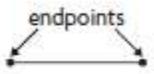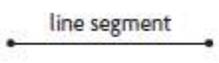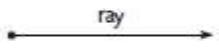
Describe plane shapes

You can use math words to describe plane shapes.
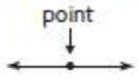
point — an exact position or location
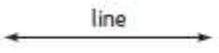
line — a straight path that goes in two directions without end

endpoints — points that are used to show segments of lines

line segment — part of a straight line and has 2 endpoints

ray — part of a straight line that has 1 endpoint and continues in one direction

A **plane shape** is a shape on a flat surface. It is formed by points that make curved paths, line segments, or both. Plane shapes can be open or closed.

A **closed shape** starts and ends at the same point.

An **open shape** does not start and end at the same point.

Look at this plane shape called a triangle.

It is a closed shape.

It has 3 line segments.

The line segments meet at the endpoints.

Lesson 12.2

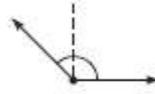Describe angels in plane shapes

There are different types of angles.

| A **right angle** forms a square corner.	Some angles are less than a right angle.	Some angles are greater than a right angle.

Look at this shape. Describe the angles.

There are 2 right angles.

There are 2 angles greater than a right angle.
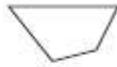
There is 1 angle less than a right angle.

right angle

greater than a right angle

greater than a right angle

less than a right angle

right angle

greater than a right angle
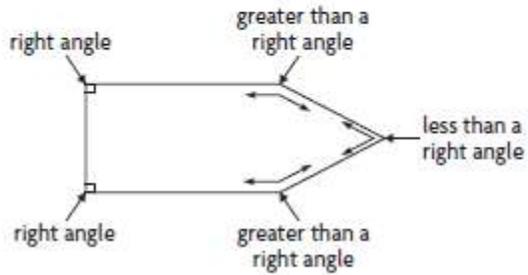
Lesson 12.3

Identify Polygons

You can identify and name polygons by the number of sides and angles they have.

3 sides	4 sides	5 sides
3 angles	4 angles	5 angles
triangle	quadrilateral	pentagon

6 sides	8 sides	10 sides
6 angles	8 angles	10 angles
hexagon	octagon	decagon

Describe and name this shape.

It has 4 sides.

It has 4 angles.
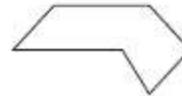
It is a quadrilateral.

Describe and name this shape.

It has 6 sides.
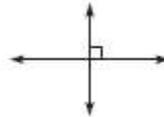
It has 6 angles.

It is a hexagon.

Lesson 12.4

Describe sides of polygons

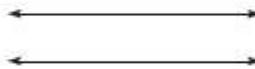There are different types of line segments in polygons.

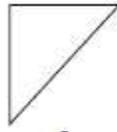- **Intersecting lines** are lines that cross or meet. Intersecting lines form angles.

- **Perpendicular lines** are intersecting lines that cross or meet to form right angles.
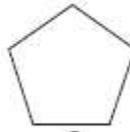
- Lines that appear never to cross or meet and are always the same distance apart are **parallel lines**. They never form angles.

A   B   C

Which shape or shapes appear to have parallel sides? A

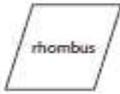Which shape or shapes appear to have perpendicular sides? A, B

Which shape or shapes appear to have intersecting sides? A, B, C

Lesson 12.5

Classify quadrilaterals

You can classify quadrilaterals by their sides and by their angles.

square

2 pairs of opposite sides
that are parallel

4 sides that are of
equal length

4 right angles

rectangle

2 pairs of opposite sides that
are parallel

2 pairs of sides that are of
equal length

4 right angles

trapezoid

1 pair of opposite sides that
are parallel

lengths of sides could be
the same.

rhombus

2 pairs of opposite sides that
are parallel

4 sides that are of equal length

How can you classify the quadrilateral?

It has only 1 pair of opposite sides that are parallel.

The lengths of all 4 sides are not equal.

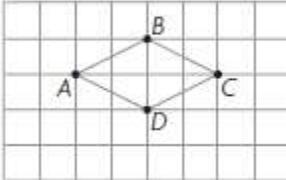So, the quadrilateral is a trapezoid.
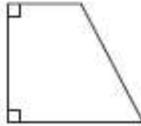
Lesson 12.6

Draw Quadrilaterals

Use grid paper to draw a quadrilateral.

Step 1 Use a ruler to draw line segments.
 Connect A to B.

Step 2 Connect B to C.

Step 3 Connect C to D.

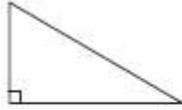**Step 4** Connect D to A.

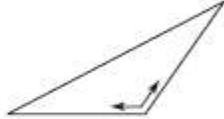Write the name of your quadrilateral.
 rhombus

Lesson 12.7

Describe triangles

| You can describe a triangle by its types of angles.	You can describe a triangle by the number of sides of equal length.
This triangle has 1 right angle.	This triangle has 0 sides of the same length.
This triangle has 1 angle greater than a right angle.	This triangle has 2 sides of the same length.
This triangle has 3 angles less than a right angle.	This triangle has 3 sides of the same length.
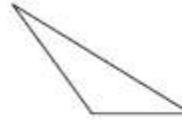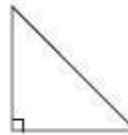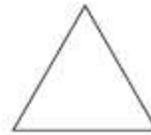
Lesson 12.8

Problem solving- classify plane shapes

A **Venn diagram** shows how sets of things are related. This Venn diagram shows how quadrilaterals and polygons with all sides of equal length are related. The shapes in the section where the circles overlap show shapes that belong to both groups.

Quadrilaterals   Polygons with All Sides of Equal Length
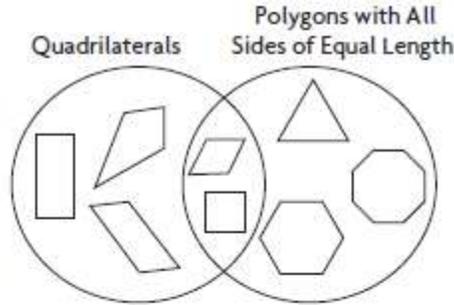
What types of polygons are in both circles?

Read the Problem	Solve the Problem
What do I need to find? what types of polygons are in both circles	What is true about all polygons in the circle labeled Quadrilaterals? They all have 4 sides.
What information do I need to use? The circles are labeled Quadrilaterals and Polygons with All Sides of Equal Length	What is true about all polygons in the other circle? They all have sides of equal length. Which polygons are in the section where the circles overlap? shapes that are quadrilaterals and that have 4 sides that are of equal length
How will I use the information? I will describe the shapes in the section where the circles overlap	So, a square and a rhombus are in the section where the circles overlap.

Lesson 12.9

Relate shape, fractions, and area

You can separate a plane shape into equal parts to explore the relationship between fractions and area.

Divide the rectangle into 6 parts with equal area. Write the fraction that names the area of each part of the whole.

Step 1 Draw lines to divide the rectangle into 6 parts with equal area. Use the grid to help you.

Step 2 Write the fraction that names each part of the divided whole.

> **Think:** Each part is 1 part out of 6 equal parts.

Each part is $\frac{1}{6}$ of the whole shape's area.

Step 3 Write the fraction that names the whole area.
> **Think:** There are 6 equal parts.

The fraction that names the whole area is $\frac{6}{6}$.