CHAPTER 8

Family Letter

Section A

What We Are Learning

Plane Geometry

Vocabulary

These are the math words we are learning:

angle formed by two rays with a common endpoint called the vertex

equilateral triangle a triangle with three congruent sides and three congruent angles

line a straight line that extends forever in both directions

parallel lines two lines in a plane that never meet

parallelogram a quadrilateral with 2 pairs of parallel sides

perpendicular lines two lines that intersect at 90° angles

plane a perfectly flat surface that extends forever in all directions

point a place in space that names a location

ray a part of a line that starts at one point and extends forever in one direction

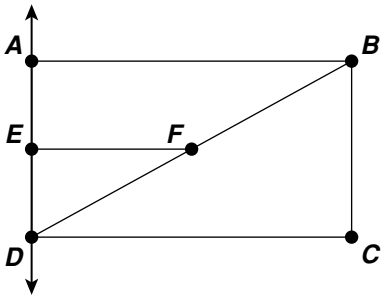
rectangle a quadrilateral with 4 right angles

transversal a line that intersects two or more lines

Dear Family,

In this section, the student will begin to study geometry. During this process, the student will learn to classify and name many geometrical figures. First, the student will review the foundation of geometry, which includes the definitions and the identification of points, lines, planes, segments, and rays.

Naming Points, Lines, Planes, Segments, and Rays



Name two lines in the figure.

$\overleftrightarrow{DA}$, $\overleftrightarrow{EA}$ Any 2 points on the line can be used.

Name a plane in the figure.

plane *AEF* or any 3 points in the plane that form a triangle

Name four segments in the figure.

$\overline{AB}$, $\overline{CD}$, $\overline{EF}$, $\overline{BC}$

Name two rays in the figure.

$\overrightarrow{AE}$, $\overrightarrow{DE}$

Angles are very important when studying geometry. Special angles have special names and relationships. Knowing these relationships will allow your child to find unknown angle measurements.

Acute: Angles that measure less than 90°.

Obtuse: Angles that measure more than 90° but less than 180°.

Right: Angles that measure exactly 90°.

Complementary: Angles whose measures add to 90°.

Supplementary: Angles whose measures add to 180°.

Family Letter

Section A continued

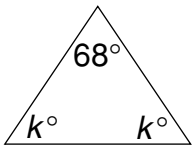
The student will also be learning about relationships between lines and planes. If two planes, or two lines within a plane, are **parallel,** they never intersect. If two planes, or two lines within a plane, are **perpendicular,** they intersect to form a right angle.

Intersecting lines can form polygons. Triangles are three-sided polygons, and quadrilaterals are four-sided polygons. Both triangles and quadrilaterals can be classified by their angles and side lengths.

The student will use the ***Triangle Sum Theorem*** to find unknown angle measures in a triangle. The theorem states that the sum of the angles of any triangle equals 180°.

Find the angle measures in the isosceles triangle.

$68° + k° + k° = 180°$	Triangle Sum Theorem
$68° + 2k° = 180°$	Combine like terms.
$-68° \quad -68°$	Subtract 68° from
$2k° = 112°$	both sides.
$\frac{2k°}{2} = \frac{112°}{2}$	Divide both sides
$k° = 56°$	by 2.



The triangle has angle measures of 56°, 56° and 68°.

Finally in this section, the student will apply knowledge of the coordinate plane and slope to geometry. The student will learn how to use slope to determine if lines on the coordinate plane are parallel or perpendicular, and will use this knowledge to classify figures drawn on the coordinate plane.

Plane geometry is one of the fundamental building blocks of mathematics. The student will use the concepts he or she learns in this section both later in this course, and in future math classes. Encourage the student to use the concepts from this section to describe things he or she sees in the real world.

Sincerely,

CHAPTER 8

Family Letter

Section B

What We Are Learning

Congruence and Transformations

Vocabulary

These are the math words we are learning:

correspondence a way of matching up two sets of objects

image the resulting figure after a translation, rotation, or reflection

reflection flips a figure across a line to create a mirror image

rotation turns a figure around a point

regular tessellation a regular polygon is repeated to fill a plane

semi-regular tessellation two or more regular polygons are repeated to fill the plane and the vertices are identical

tessellation a repeating pattern of plane figures that completely covers a plane without gaps or overlaps

transformation translating, reflecting, or rotating an object

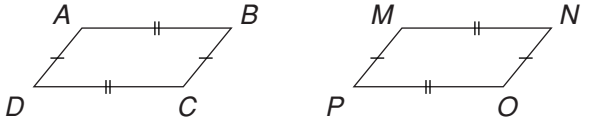
translation slides a figure along a line without turning

Dear Family,

In this section, the student will begin to apply geometrical properties to solve problems. One such property addresses congruent figures. As the student previously learned, if two polygons are congruent, then all of their corresponding sides and angles are also congruent.

The student will write congruence statements for pairs of polygons by writing the second polygon in order of correspondence, or matching up the corresponding vertices between the two polygons.

Write a congruence statement for this pair of polygons.



$\angle A \cong \angle M$ so $\angle A$ corresponds to $\angle M$.

$\angle B \cong \angle N$ so $\angle B$ corresponds to $\angle N$.

$\angle C \cong \angle O$ so $\angle C$ corresponds to $\angle O$.

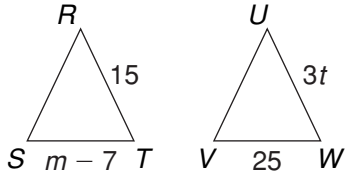
$\angle D \cong \angle P$ so $\angle D$ corresponds to $\angle P$.

The congruence statement is
parallelogram $ABCD \cong$ parallelogram $MNOP$.

Note how the vertices in the first polygon are written in order around the polygon starting at any vertex. The vertices in the second polygon, therefore, have to be written in the same order.

If you know polygons are congruent, you can find an unknown value in the polygon.

In the figure, triangle *RST* ≅ triangle *UVW*. Find *m*.



$m - 7 = 25$ $\quad ST \cong VW$

$m - 7 = 25$
$+7 \quad +7$ Add 7 to both sides.
$m = 32$

The value of m is 32.

Family Letter

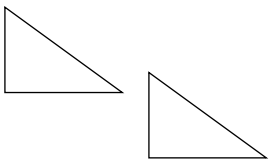
Section B continued

Another set of geometrical concepts your child will be learning about is **transformations.** Transformations include rotations, reflections, and translations of congruent figures.

If you move a figure along a line, it is called a **translation.** If you turn a figure around a point, it is called a **rotation.** If you flip a figure across a line to create a mirror image, it is called a **reflection.**

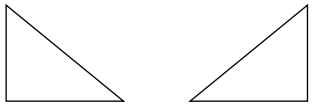
Identify each as a translation, rotation, reflection, or none.

A.



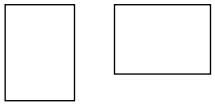
This is called a translation.

B.



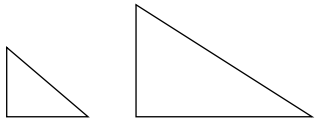
This is called a reflection.

C.



This is called a rotation.

D.



This is not a transformation.

The student will also learn about **tessellations.** A tessellation is a repeating pattern of plane figures that fills a plane without leaving any gaps or holes. Tessellations are often used in art and architecture. In fact, there's a good chance that you have tessellations in your home! For example, square tiles covering a wall or floor form a simple tessellation.

Your child will have a solid background in geometry as the concepts in this section are explored. Discuss with your child the many applications geometry has in our lives.

Sincerely,