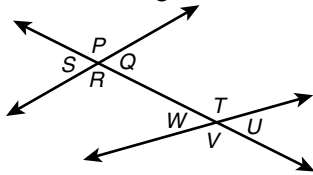


Date \_\_\_\_\_

Dear Family,

In this chapter, your child will learn about **parallel and perpendicular lines** and the angles associated with these lines. Your child will learn to recognize a variety of angle pairs and then use this knowledge to prove that lines are parallel or perpendicular. Your child will also learn how to determine the slope of a line in a coordinate plane and how to write the equation for the line in two different ways.

Your child will recognize four different types of angle pairs.



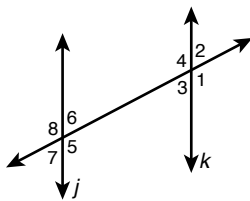
In this figure, there are four pairs of **corresponding angles**.  $\angle S$  and  $\angle W$  are corresponding;  $\angle P$  and  $\angle T$  are corresponding;  $\angle R$  and  $\angle V$  are corresponding; and  $\angle Q$  and  $\angle U$  are corresponding. Corresponding angles lie on the same side of the transversal.

Another set of angles in this figure are the **alternate interior angles**. In this case,  $\angle R$  and  $\angle T$  are opposite interior angles, as are  $\angle Q$  and  $\angle W$ . It's important to note the relative position of the angles with respect to the transversal.

It is possible, in a figure like this one, to find pairs of **alternate exterior angles**. For example,  $\angle P$  and  $\angle V$  are alternate exterior angles, as are  $\angle S$  and  $\angle U$ .

The last set of angle pairs your child will learn to recognize is the **same-side interior angles**. In this diagram,  $\angle R$  and  $\angle W$  are one pair of same-side interior angles.  $\angle Q$  and  $\angle T$  are another pair.

Your child will learn about congruent angles associated with parallel lines. This figure shows two parallel lines,  $j$  and  $k$ .

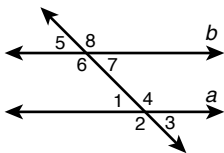


The **Same-Side Interior Angles Theorem** can be used to show that  $m\angle 5 + m\angle 3 = 180^\circ$  and that  $m\angle 6 + m\angle 4 = 180^\circ$ . The theorem states that if two parallel lines are cut by a transversal, then the two pairs of same-side interior angles are supplementary.

The **Alternate Exterior Angles Theorem** shows that  $\angle 2$  and  $\angle 7$  in the figure are congruent. The theorem states that if two parallel lines are cut by a transversal, the two pairs of alternate exterior angles are congruent.

Your child will be able to prove that  $\angle 6 \cong \angle 3$  by using the **Alternate Interior Angles Theorem**. This theorem states that if two parallel lines, such as  $j$  and  $k$  in this figure, are cut by a transversal, then the pairs of alternate interior angles are congruent.

Your child will then use the converses of the **Corresponding Angle Postulate** and the theorems referred to above to prove that lines are parallel. Look at the following proofs as examples of the type of work that will be expected of your child.



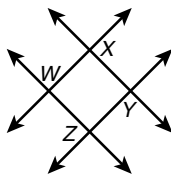
**Given:**  $\angle 2 \cong \angle 3$ ;  $\angle 3 \cong \angle 6$

**Prove:**  $a \parallel b$

**Proof:**

Statements	Reasons
1. $\angle 2 \cong \angle 3$ ; $\angle 3 \cong \angle 6$	1. Given
2. $\angle 2 \cong \angle 6$	2. Transitive Property of Congruence
3. $a \parallel b$	3. Converse of Corresponding Angles Postulate

Your child will then learn to prove that two lines are perpendicular.



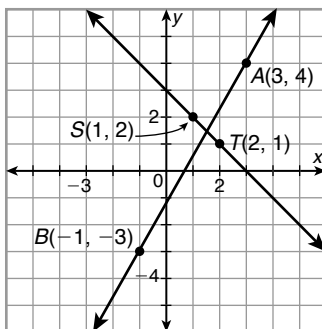
**Given:**  $\vec{WZ} \parallel \vec{XY}$ ;  $\vec{XY} \perp \vec{ZY}$

**Prove:**  $\vec{WZ} \perp \vec{ZY}$

**Proof:**

Statements	Reasons
1. $\vec{WZ} \parallel \vec{XY}$ ; $\vec{XY} \perp \vec{ZY}$	1. Given
2. $\vec{WZ} \perp \vec{ZY}$	2. Perpendicular Transversal Theorem

Also in this chapter, your child will learn to find the slope of a line and to write equations describing lines in a coordinate plane.



Your child will learn to determine the slope of  $\vec{AB}$ . This can be done as follows:

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{(-3) - 4}{(-1) - 3} = \frac{-7}{-4} = \frac{7}{4}$$

Your child will also be asked to find the equation of a line on a coordinate plane.

The equation for  $\vec{AB}$  can be found as follows:

$$y - y_1 = m(x - x_1)$$

$$y - 4 = \frac{7}{4}(x - 3)$$

For additional resources, visit [go.hrw.com](http://go.hrw.com) and enter the keyword MG7 Parent.