**Activity 3.2.2 Parallel Lines Corresponding Angles Converse**

1. Prove the **Parallel Lines Corresponding Angles Converse:** If two lines are cut by a transversal and a pair of corresponding angles are congruent, then the lines are parallel. Fill in the blanks.

Given: Transversal $\overleftrightarrow{EF}$ intersects lines $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ at points *E* and *F*.

m $∠$ *CFG* = m $∠$ *AEF*.

Prove: $\overleftrightarrow{AB}$ || $\overleftrightarrow{CD}$

Proof:

$\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ either intersect or they are parallel.

Why? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Suppose $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ intersect at a point we will call “*H.*”

Then *E*, *F*, and *H* are the vertices of a triangle.

In ∆*EFH*, $∠$ *HEF* is an\_\_\_\_\_\_\_\_\_\_\_\_\_ angle. (Note: $∠$ *HEF* is another name for $∠$ *AEF*)
and $∠$ *HFG* is an \_\_\_\_\_\_\_\_\_ angle. (Note: $∠$ *HFG* is another name for $∠$ *CFG*)

We were given that m $∠$ *HEF* = m \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Why is this a problem? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What conclusion can you draw? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Prove: If two lines are perpendicular to the same line, then they are parallel.

Complete this two-column proof.



Given:

$\overleftrightarrow{CA}$ is perpendicular to $\overleftrightarrow{AB}$

$\overleftrightarrow{DB}$ is perpendicular to $\overleftrightarrow{AB}$

Prove:

$\overleftrightarrow{CA}$ is parallel to $\overleftrightarrow{DB}$

Proof:

Statement Reason

1. $\overleftrightarrow{CA}$ is perpendicular to $\overleftrightarrow{AB}$ 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. m $∠$ *CAE* = 90° 2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. $\overleftrightarrow{DB}$ is perpendicular to $\overleftrightarrow{AB}$ 3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. m $∠$ *DBA* = 90° 4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. m $∠$ *CAE* = m $∠$ \_\_\_\_\_\_\_\_\_ 5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 6. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_