## Unit 2 Lesson 7: Angle-Side-Angle Triangle Congruence

### 1 Notice and Wonder: Assertion (Warm up)

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#### Student Task Statement

Assertion: Through 2 distinct points passes a unique line. Two lines are said to be *distinct* if there is at least 1 point that belongs to one but not the other. Otherwise, we say the lines are the same. Lines that have no point in common are said to be *parallel*.

Therefore, we can conclude: given 2 distinct lines, either they are parallel, or they have exactly 1 point in common.

What do you notice? What do you wonder?

### 2 Proving the Angle-Side-Angle Triangle Congruence Theorem

#### Student Task Statement

1. Two triangles have 2 pairs of corresponding angles congruent, and the corresponding sides between those angles are congruent. Sketch 2 triangles that fit this description.
2. Label the triangles $WXY$ and $DEF$, so that angle $W$ is congruent to angle $D$, angle $X$ is congruent to angle $E$, and side $WX$ is congruent to side $DE$.
3. Use a sequence of rigid motions to take triangle $WXY$ onto triangle $DEF$. For each step, explain how you know that one or more vertices will line up.

#### Activity Synthesis



$∠A≅∠C,\overset{¯}{AE}≅\overset{¯}{EC},∠DEA≅∠BEC$, so $△DEA≅△BEC$



### 3 Find the Missing Angle Measures (Optional)

#### Student Task Statement

Lines $ℓ$ and $m$ are parallel. $a=42$. Find $b$, $c$, $d$, $e$, $f$, $g$, and $h$.

$ℓ∥m$



### 4 What Do We Know For Sure About Parallelograms?

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$\overset{¯}{NM}∥\overset{¯}{KL},\overset{¯}{NK}∥\overset{¯}{NL}$, so $MNKL$ is a parallelogram



#### Student Task Statement

Quadrilateral $ABCD$ is a **parallelogram**. By definition, that means that segment $AB$ is parallel to segment $CD$, and segment $BC$ is parallel to segment $AD$.

1. Sketch parallelogram $ABCD$ and then draw an auxiliary line to show how $ABCD$ can be decomposed into 2 triangles.
2. Prove that the 2 triangles you created are congruent, and explain why that shows one pair of opposite sides of a parallelogram must be congruent.

#### Activity Synthesis

$MNKL$ is a parallelogram so $\overset{¯}{NM}≅\overset{¯}{KL},\overset{¯}{NK}≅\overset{¯}{ML}$





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