

# Geometry

**Chapter 7**  
**Section 7-3**

# Angle-Angle Similarity



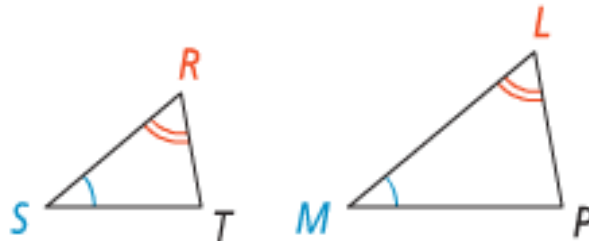
## Postulate 7-1 Angle-Angle Similarity (AA $\sim$ ) Postulate

### Postulate

If two angles of one triangle are congruent to two angles of another triangle, then the triangles are similar.

If ...

$$\angle S \cong \angle M \text{ and } \angle R \cong \angle L$$



Then ...

$$\triangle SRT \sim \triangle MLP$$

# Proving Triangles Similar

Given:  $\angle B \cong \angle E$

Prove:  $\triangle ABC \sim \triangle FEC$

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$$\angle B \cong \angle E$$

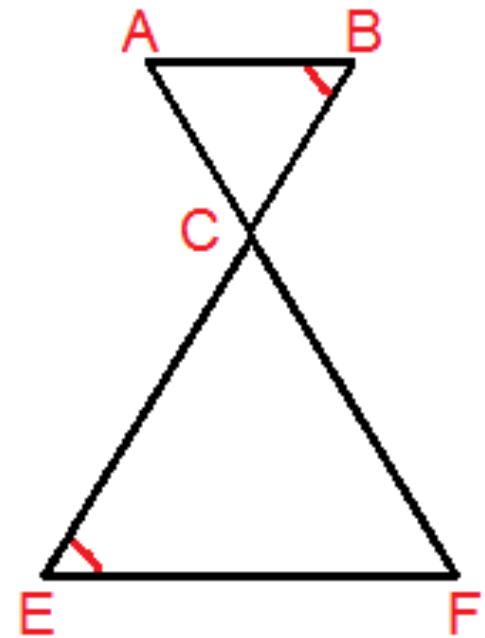
Given

$$\angle BCA \cong \angle ECF$$

Vertical Angles

$$\triangle ABC \sim \triangle FEC$$

AA~



# Similarity with Proportions

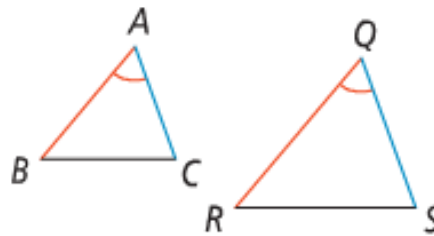
## Theorem 7-1 Side-Angle-Side Similarity (SAS $\sim$ ) Theorem

### Theorem

If an angle of one triangle is congruent to an angle of a second triangle, and the sides that include the two angles are proportional, then the triangles are similar.

If ...

$$\frac{AB}{QR} = \frac{AC}{QS} \text{ and } \angle A \cong \angle Q$$



Then ...

$$\triangle ABC \sim \triangle QRS$$

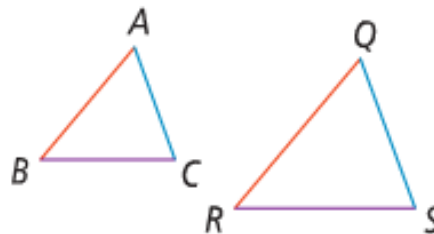
## Theorem 7-2 Side-Side-Side Similarity (SSS $\sim$ ) Theorem

### Theorem

If the corresponding sides of two triangles are proportional, then the triangles are similar.

If ...

$$\frac{AB}{QR} = \frac{AC}{QS} = \frac{BC}{RS}$$



Then ...

$$\triangle ABC \sim \triangle QRS$$

# Proving Triangles Similar

Given:  $TX = EX$ ,  $XY = XZ$

Prove:  $\triangle TEX \sim \triangle YZX$

Could you prove  $\triangle TEX \sim \triangle ZYX$  ?  
How would the proof change?

$$TX = EX, XY = XZ$$

$$\angle EXT \cong \angle YXZ$$

$$\frac{TX}{XY} = \frac{EX}{XZ}$$

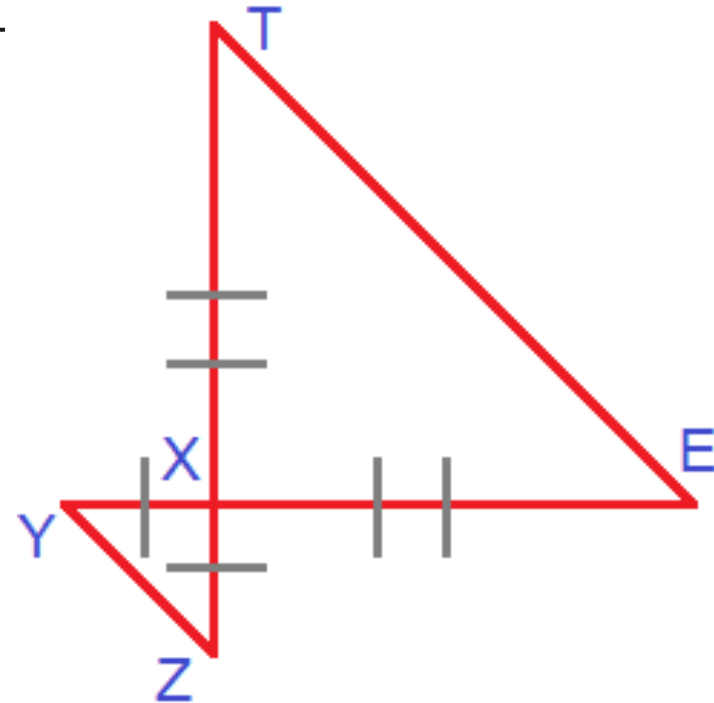
$$\triangle TEX \sim \triangle YZX$$

Given

Vertical Angles

Division Property

SAS~



# Proving Triangles Similar

Given:  $TX = EX$ ,  $XY = XZ$

Prove:  $\triangle TEX \sim \triangle ZYX$

$$TX = EX, XY = XZ$$

$$\angle EXT \cong \angle YXZ$$

$$\frac{TX}{XZ} = \frac{EX}{XY}$$

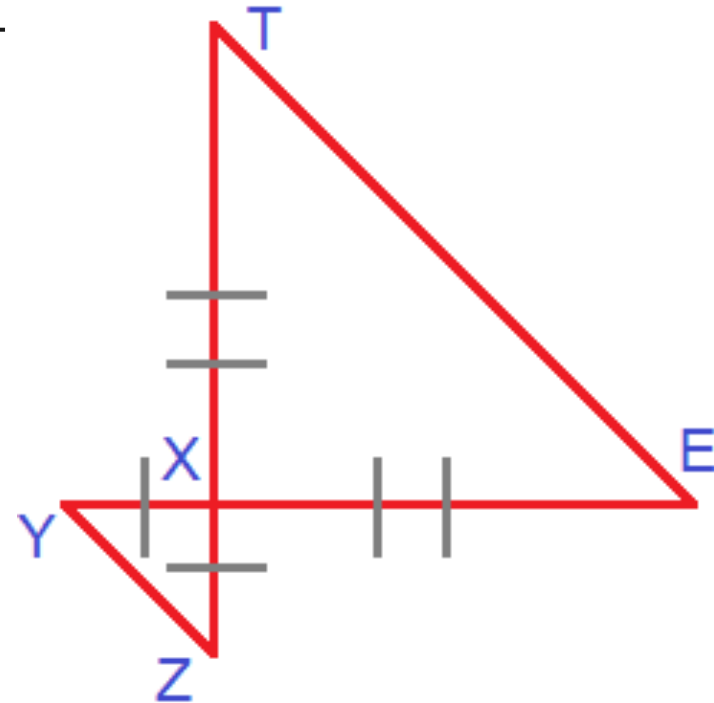
$$\triangle TEX \sim \triangle ZYX$$

Given

Vertical Angles

Division Property

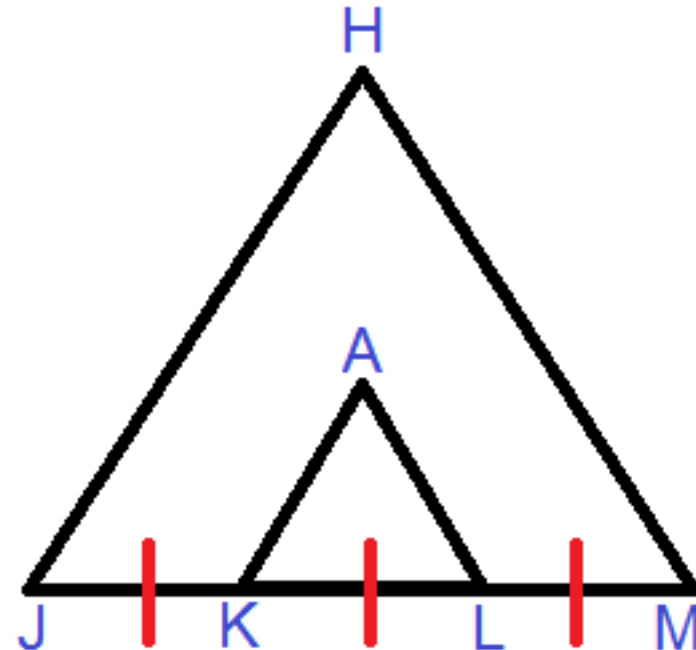
SAS~



# Proving Triangles Similar

$JK = KL = LM,$ $HJ = 3AK, HM = 3AL$	Given
$\frac{HJ}{AK} = 3,$ $\frac{HM}{AL} = 3$	Division Property
$JK + KL + LM = JM$	Segment Addition
$KL + KL + KL = JM$	Substitution
$3KL = JM$	Simplify
$\frac{JM}{KL} = 3$	Division Property
$\frac{HJ}{AK} = \frac{HM}{AL} = \frac{JM}{KL}$	Transitive
$\triangle HJM \sim \triangle AKL$	SSS~

Given:  $JK = KL = LM,$   
 $HJ = 3AK, HM = 3AL$   
 Prove:  $\triangle HJM \sim \triangle AKL$



# Proving Triangles Similar

Are the triangles similar?

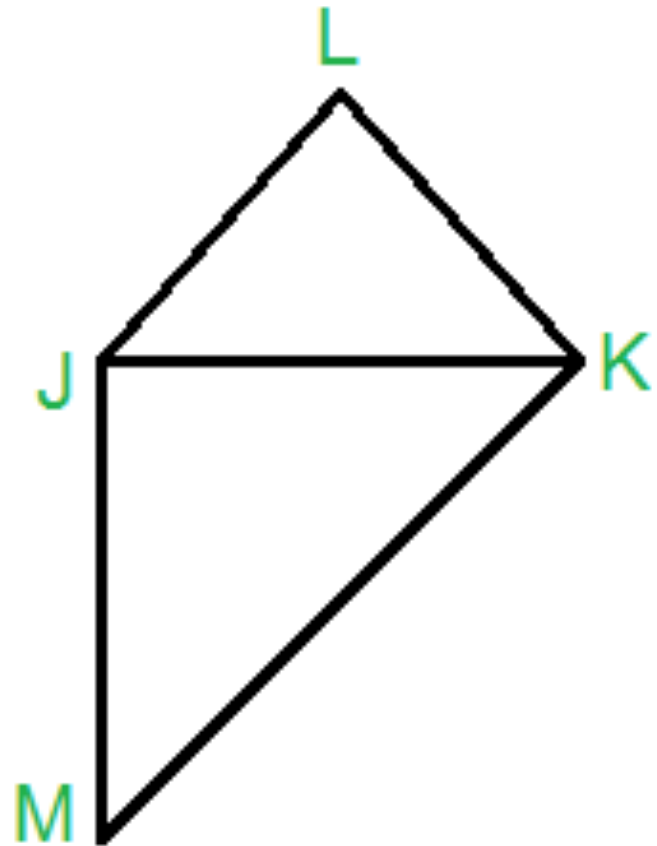
$$MJ = 5$$

$$JK = 6$$

$$MK = 9$$

$$LK = 4$$

$$JL = 3$$





# Proving Triangles Similar

Are the triangles similar?

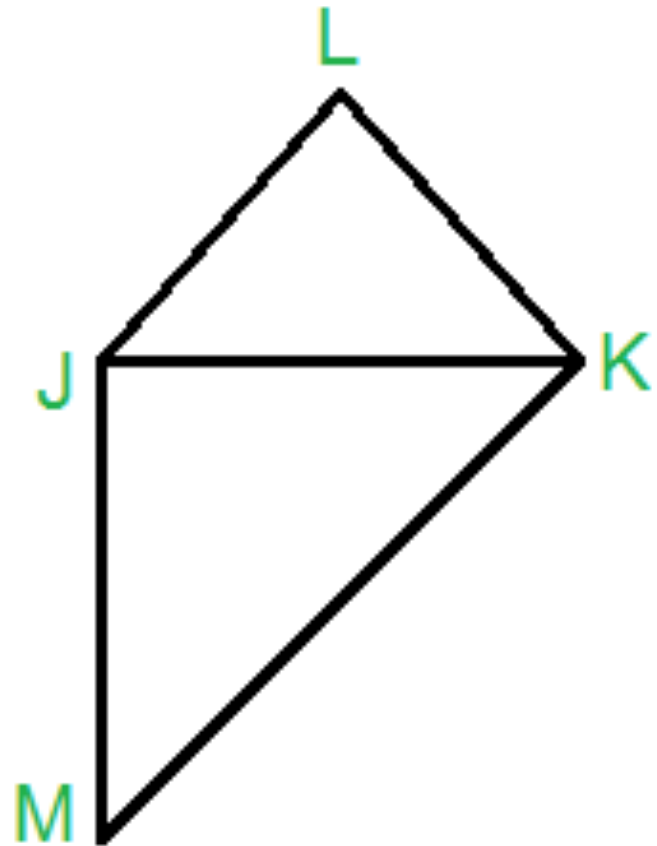
$$MJ = 12$$

$$JK = 12$$

$$MK = 18$$

$$LK = 8$$

$$JL = 8$$



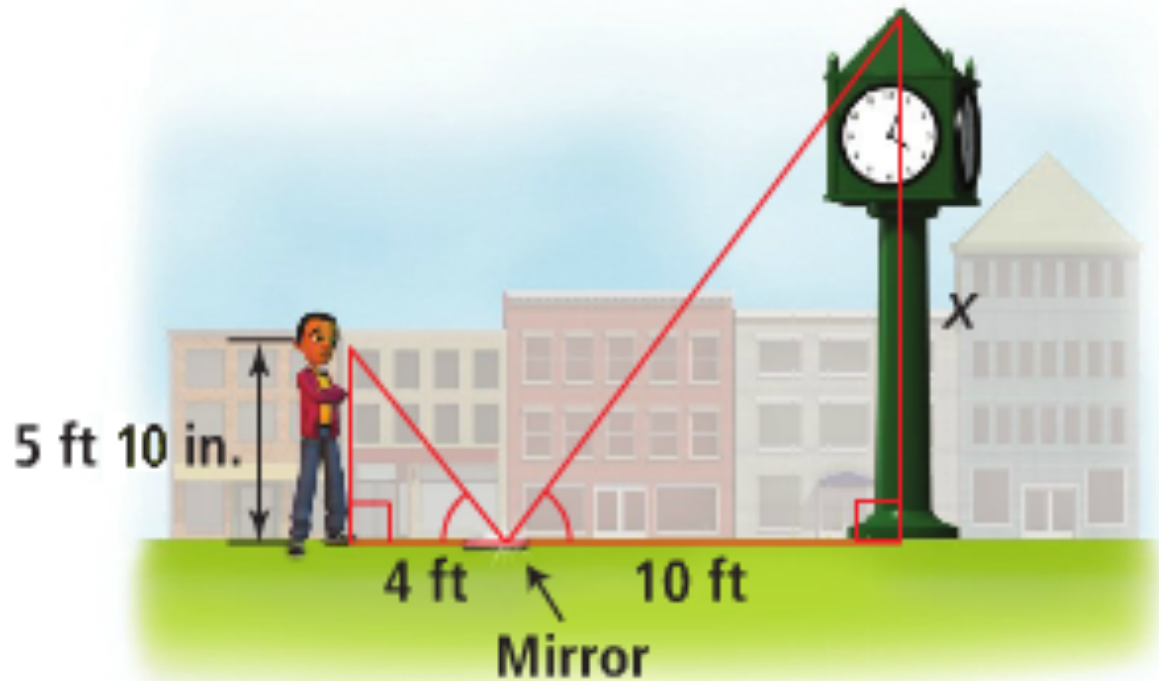
# Using Similar Triangles

*How do you know the triangles are similar?*

*AA~*

*How tall is the clock tower?*

*14 ft 7 in.*



# Homework

**Pages 455 - 457**

**# 7 - 13 all, 15, 21, 24, 26, 28**