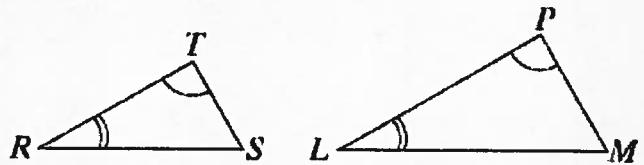# Lesson 7-3

Proving Triangles Similar

Vocabulary and Key Concepts

Postulate 7-1: Angle-Angle Similarity (AA~) Postulate

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

$\triangle TRS \sim \triangle \boxed{PLM}$

Theorem 7-1: Side-Angle-Side Similarity (SAS~) Theorem

If an angle of one triangle is congruent to an angle of a second triangle, and the sides including the two angles are proportional, then

the two triangles are similar

Theorem 7-2: Side-Side-Side Similarity (SSS~) Theorem

If the corresponding sides of two triangles are proportional, then

the two triangles are similar

Examples

1 **Using the AA~ Postulate** $\overline{MX} \perp \overline{AB}$. Explain why the triangles are similar. Write a similarity statement.
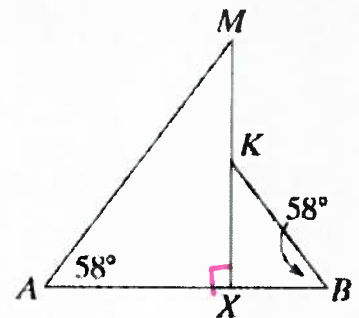
Because $\overline{MX} \perp \overline{AB}$, $\angle AXM$ and $\angle BXK$ are

$\boxed{\text{right angles}}$, so $\angle AXM \cong \angle \boxed{BXK}$.

$\angle A \cong \angle \boxed{B}$ because their measures are equal.

$\triangle AMX \sim \triangle BKX$

by the $\boxed{AA\sim}$ Postulate.

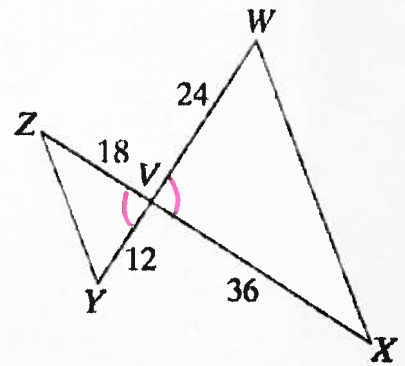**❷ Using Similarity Theorems** Explain why the triangles must be similar. Write a similarity statement.

$\angle YVZ \cong \angle WVX$ because <u>VAT</u>

$\frac{VY}{VW} = \frac{12}{24} = \frac{1}{2}$ and $\frac{VZ}{VX} = \frac{18}{36} = \frac{1}{2}$,

so <u>corresponding sides are proportional.</u>

Therefore, $\triangle YVZ \sim \triangle WVX$

by the | SAS $\sim$ | Theorem.
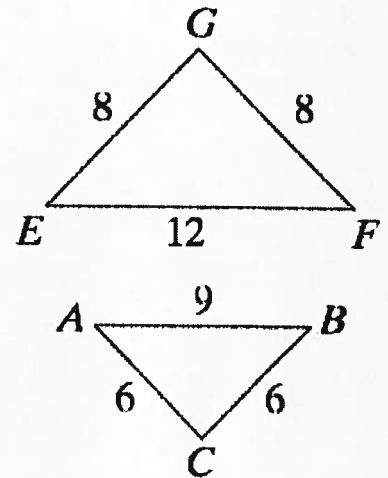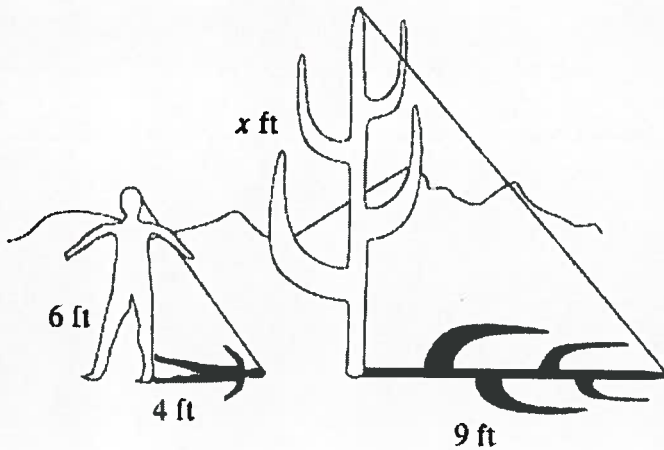
Explain why the triangles at the right must be similar. Write a similarity statement.

$\frac{12}{9} = \frac{4}{3}$ ✓ $\frac{8}{6} = \frac{4}{3}$ ✓   Sides are proportional

$\triangle EFG \sim \triangle ABC \rightarrow SSS \sim$

3. In sunlight, a cactus casts a 9-ft shadow. At the same time, a person 6 ft tall casts a 4-ft shadow. Use similar triangles to find the height of the cactus.

x ft

6 ft

4 ft

9 ft

$\frac{Height}{Shadow} \rightarrow \frac{6}{4} = \frac{x}{9}$ $4x = 54$ $x = \boxed{13.5 ft}$

See Chapter 7 Answers to Check

| 2/3 | **QUIZ:** Radicals, Quadratic Formula, Ratios, Proportions, and Similar Figures |
| | 7.3 #s 1,2,4-19 |