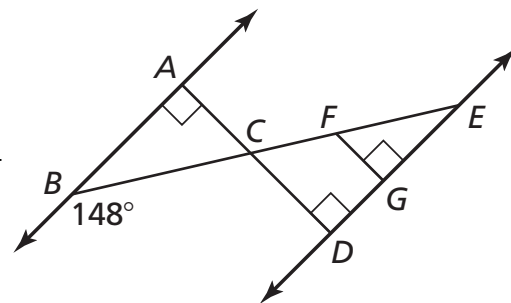## 8.3 Start Thinking

A carpentry class is working on a project for the local childcare centers. The students are making wooden trees to go with the centers' train sets. They work from a sample that was cut from a three-inch tall triangular block of wood. The goal is to make more trees, proportional to the sample, but larger. Use the diagrams below to determine the lengths of the sides x and y of the triangles for trees made from four-inch and five-inch blocks of wood.

3.25"   3" x 4" x 5"

2.5"
Sample y y
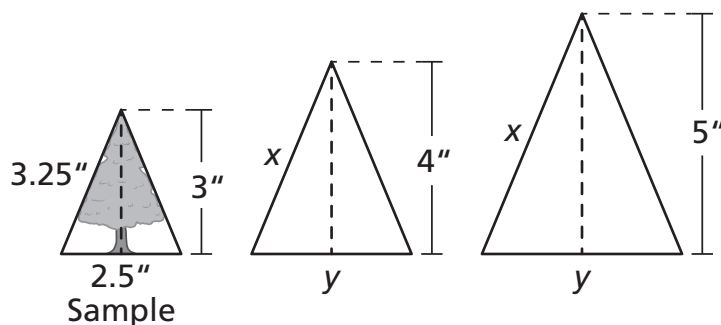
8.3 Warm Up

Use the diagram to copy and complete the statement.

1. $\triangle ABC \sim$ _____

2. $\triangle FEG \sim$ _____

3. $m\angle ACB =$ _____

4. $m\angle FEG =$ _____

5. $m\angle ACE =$ _____

6. $\overline{AD} \parallel$ _____
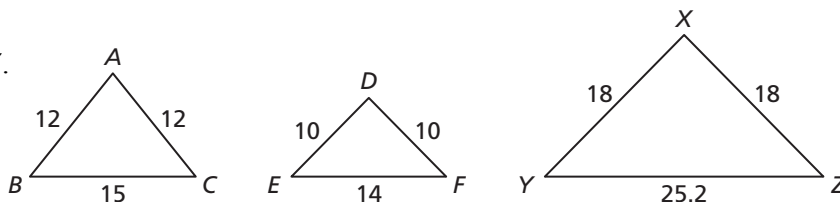
8.3 Cumulative Review Warm Up

Write an equation of the line passing through point *P* that is perpendicular to the given line.

1. $P(0, -3)$, $y = -5x$

2. $P(4, 0)$, $y = 9x + 8$

3. $P(-2, 4)$, $2x - 3y = -8$

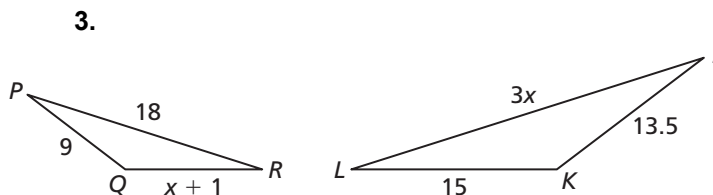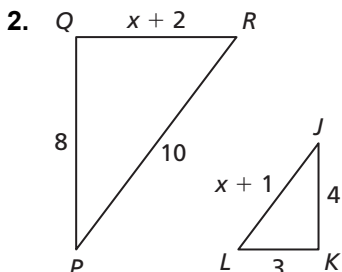**4.** $P\left(-\frac{2}{3}, 1\right)$, $y - 8 = -\frac{5}{2}(x + 3)$

8.3 Practice A

1. Determine whether $\triangle ABC$ or $\triangle DEF$ is similar to $\triangle XYZ$.

In Exercises 2 and 3, find the value of x that makes $\triangle PQR \sim \triangle JKL$.
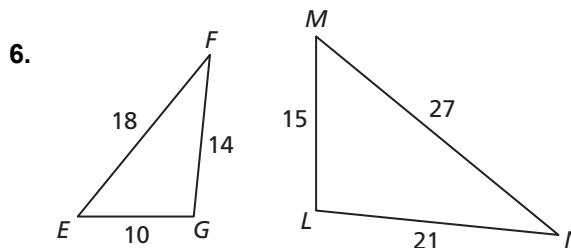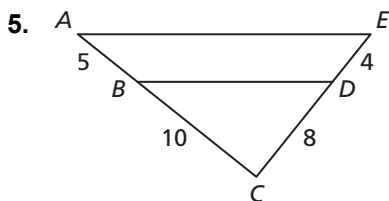
2.

3.

4. Verify that $\triangle TUV \sim \triangle XYZ$. Find the scale factor of $\triangle TUV$ to $\triangle XYZ$.

$\triangle TUV$: $TU = 15$, $UV = 21$, $TV = 18$ $\triangle XYZ$: $XY = 35$, $YZ = 49$, $XZ = 42$

In Exercises 5 and 6, show that the triangles are similar and write a similarity statement. Explain your reasoning.
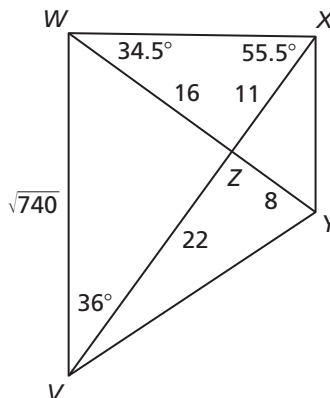
5.

6.

In Exercises 7–11, use the diagram to copy and complete the statement.

7. $\triangle VWZ \sim$ ____   **8.** $m\angle VZY =$ ____

9. $m\angle VWY =$ ____   **10.** $m\angle WXY =$ ____
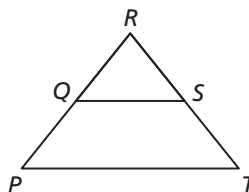
11. $XY =$ ____

12. In the figure for Exercises 7–11, is $\triangle WXZ \sim \triangle YVZ$? Explain your reasoning.

13. Use the figure to write a two-column proof.

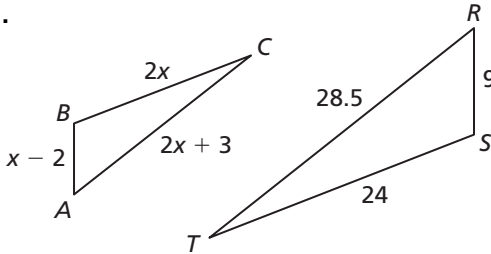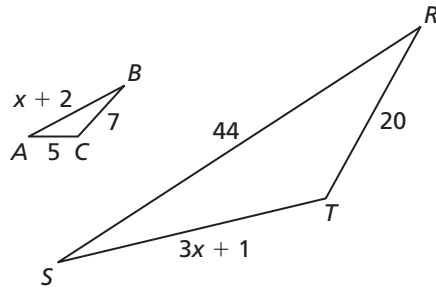**Given:** $\dfrac{PR}{QR} = \dfrac{TR}{SR}$ **Prove:** $\overline{QS} \parallel \overline{PT}$

Name_____ Date _____

8.3 Practice B

In Exercises 1 and 2, find the value of *x* that makes △*ABC* ~ △*RST*.

1.

2x, C, R, 28.5, 9, B, S, x − 2, 2x + 3, 24, A, T

2.

R, B, x + 2, 7, 44, 20, A 5 C, T, 3x + 1, S

3 Verify that △*JKL* ~ △*PQR*. Find the scale factor of △*JKL* to △*PQR*.
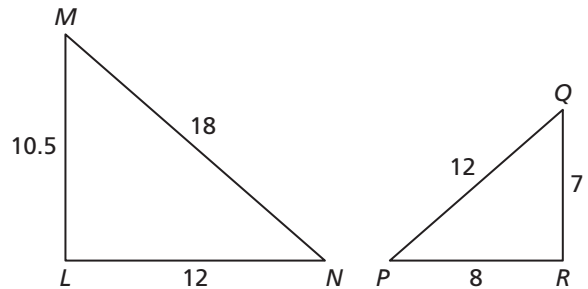
△*JKL*: *JK* = 15, *KL* = 30, *JL* = 25   △*PQR*: *PQ* = 12, *QR* = 24, *PR* = 20

In Exercises 4 and 5, show that the triangles are similar and write a similarity statement. Explain your reasoning.
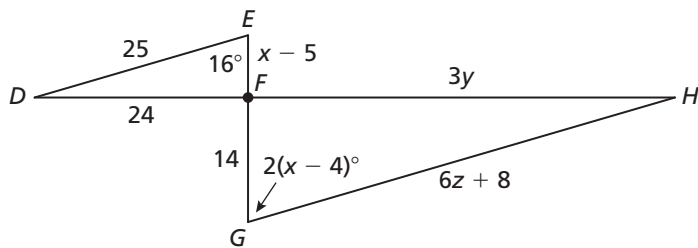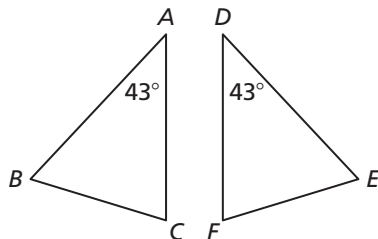
4.

X, 15, 27, W, Y, 20, 36, V, Z

5.

M, Q, 18, 10.5, 12, 7, L, 12, N, P, 8, R
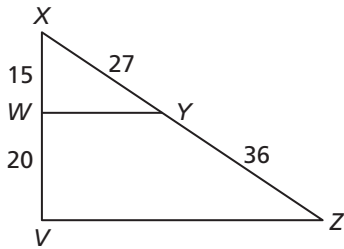
6. △*ABC* has side lengths 42, 21, and 35 units. The shortest side of a triangle similar to △*ABC* is 9 units long. Find the other lengths of the triangle.

7. Use the figure to find the values of *x, y,* and *z* that makes △*DEF* ~ △*GHF*.

E, 25, 16°, x − 5, 3y, F, H, D, 24, 14, 2(x − 4)°, 6z + 8, G

Use the figure to write a two-column proof

8. Given: $\dfrac{AC}{DF} = \dfrac{AB}{DE}$ **Prove:** ∠*B* ≅ ∠*E*

A D, 43°, 43°, B, E, C F

9. Given: *LN* = 2*x*

MN = 2*y*

NP = *x*

NQ = *y*

Prove: △*MLN* ~ △*PQN*
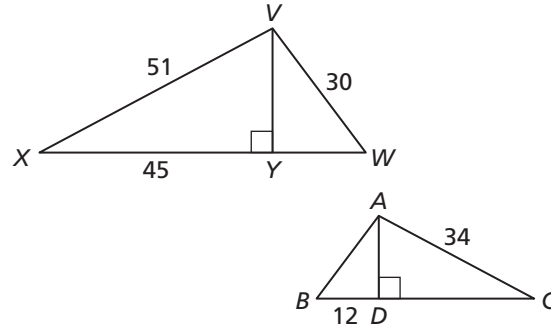

P, Q, x, y, N, 2x, 2y, L, M
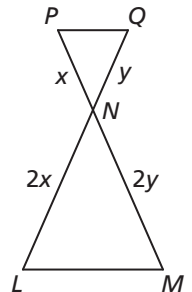
8.3 Enrichment and Extension

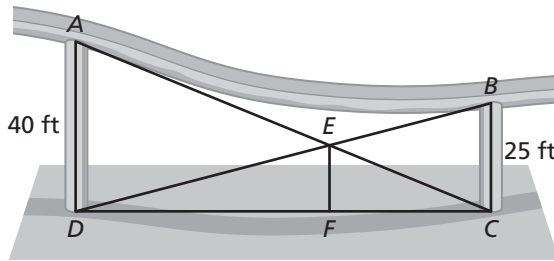## Proving Triangles Similar by SSS and SAS

1. In the figure, $\triangle ABC \sim \triangle VWX$.

   a. Find the scale factor of $\triangle VWX$ to $\triangle ABC$.

   b. Find the ratio of the area of $\triangle VWX$ to the area of $\triangle ABC$.

2. Given $\triangle DEF \sim \triangle GHI$, $m\angle D = 50°$, $m\angle G = (2x + 5y)°$, $m\angle I = (5x + y)°$, and that $m\angle E = (102 - x)°$, find $m\angle I$.

3. A portion of a water slide in an amusement park is shown. Find the length of $\overline{EF}$, if the posts and $\overline{EF}$ form a right angle with the ground
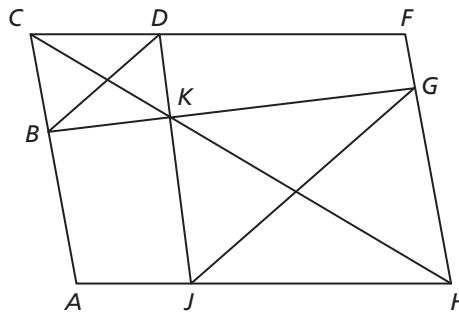
4. A streetlight is mounted at the top of a 15-foot pole. A 6-foot man walks away from the pole along a straight path. How long is his shadow when he is 40 feet from the pole?

5. Use the information and the diagram to prove the statement.

   Given: $\overline{AH} \parallel \overline{CF}$ and $\overline{CA} \parallel \overline{FH}$

   Prove: $\triangle BKD \sim \triangle GKJ$
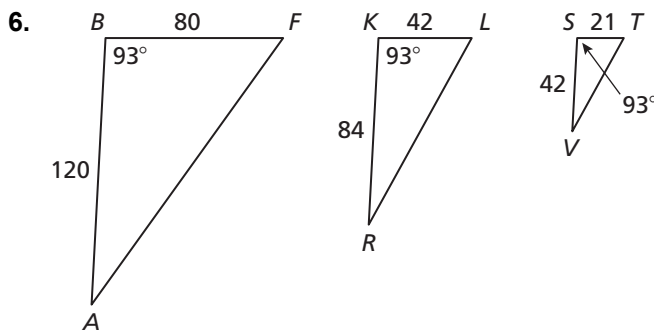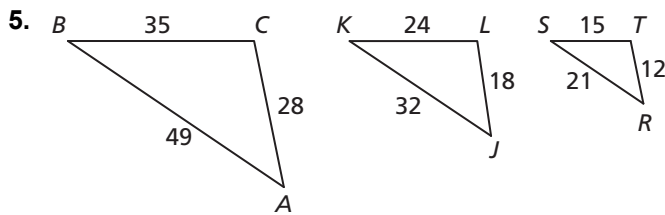
8.3 Puzzle Time

What Speaks Every Language?

Circle the letter of each correct answer in the boxes below. The circled letters will spell out the answer to the riddle.

Complete the sentence.

1. If the corresponding side lengths of two triangles are _____, then the triangles are similar.

2. If an angle of one triangle is congruent to an angle of a second triangle and the lengths of the sides including these angles are proportional, then the triangles are _____.

3. If two nonvertical lines are _____, then they have the same slope.

4. If two _____ lines are perpendicular, then the product of their slopes is −1.

Name the triangle that is not similar.

5.

B ____35____ C   K ___24___ L   S 15 T

28
32
18
21
12
49
J
R
A

6.

B ____80____ F   K 42 L   S 21 T

93°
93°
93°
120
84
42
A
R
V

T	A	H	I	N	K	E
$\triangle ABC$	proportional	concurrent	$\triangle VST$	parallel	$\triangle RKL$	$\triangle ABF$
R	**S**	**C**	**O**	**H**	**O**	**B**
congruent	perpendicular	similar	equal	$\triangle JKL$	nonvertical	$\triangle RST$