

Cross Multiply to solve each Proportion

1. $\frac{9}{24} = \frac{12}{x}$

2. $\frac{x-3}{3} = \frac{2}{x+2}$

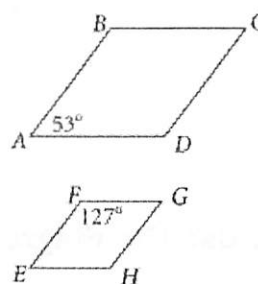
Two figures that have the same shape but not necessarily the same size are similar (\sim). Two polygons are **similar** if (1) corresponding angles are congruent and (2) corresponding sides are proportional. The ratio of the lengths of corresponding sides is the **similarity ratio**.

1 EXAMPLE Understanding Similarity

$ABCD \sim EFGH$. Complete each statement.

a. $m\angle E = \square$
 $m\angle E = m\angle A = 53$ Corresponding angles are \cong .

b. $\frac{AB}{EF} = \frac{AD}{EH}$
 $\frac{AB}{EF} = \frac{AD}{EH}$ Corresponding sides are proportional.



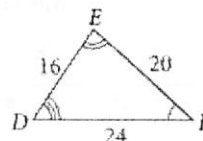
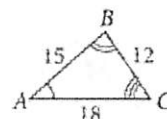
2 EXAMPLE Determining Similarity

Determine whether the triangles are similar. If they are, write a similarity statement and give the similarity ratio.

Three pairs of angles are congruent.
 Also, corresponding sides are proportional.

$\frac{AC}{FD} = \frac{18}{24} = \frac{3}{4}$ $\frac{AB}{FE} = \frac{15}{20} = \frac{3}{4}$ $\frac{BC}{ED} = \frac{12}{16} = \frac{3}{4}$

$\triangle ABC \sim \triangle FED$ with a similarity ratio of $\frac{3}{4}$ or $3 : 4$.



This is the similarity statement and similarity ratio

3 EXAMPLE Using Similar Figures

Algebra $LMNO \sim QRST$

Find the value of x .

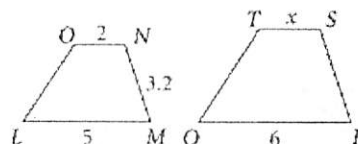
Write a proportion.

$\frac{LM}{QR} = \frac{ON}{TS}$ Corresponding sides of \sim polygons are proportional.

$\frac{5}{6} = \frac{2}{x}$ Substitute.

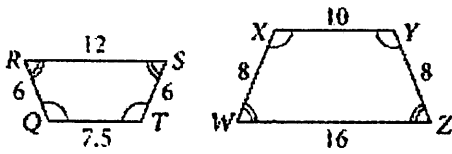
$5x = 12$ Cross-Product Property

$x = 2.4$ Solve for x .

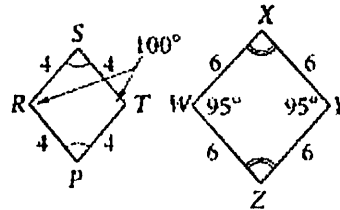


Are the polygons similar? If they are, write a similarity statement and give the similarity ratio. If they are not, explain.

3.

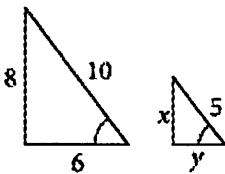


4.

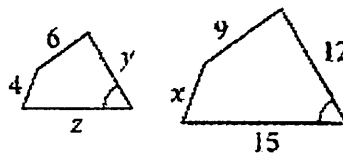


The polygons are similar. Find the value of each variable.

5.

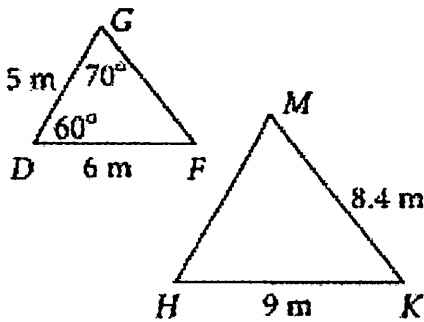


6.



$\triangle DFG \sim \triangle HKM$. Use the diagram to find the following.

7.



$$m\angle F =$$

$$m\angle K =$$

$$m\angle M =$$

$$\frac{DF}{HK} =$$

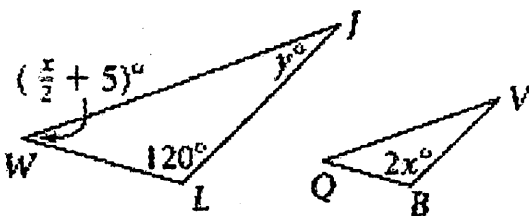
$$\overline{HM} =$$

$$\overline{GF} =$$

The similarity ratio of $\triangle DFG$ to $\triangle HKM$ is _____

Find the value of the variables.

8.



$$\triangle WLJ \sim \triangle QBV$$

Cross Multiply to solve each Proportion

$$\frac{9}{24} = \frac{12}{x}$$

$$\frac{9x}{9} = \frac{288}{9}$$

$$x = 32$$

$$2. \frac{x-3}{3} = \frac{2}{x+2}$$

$$(x-3)(x+2) = 6$$

$$x^2 - x - 6 = 6$$

$$-6 \quad -6$$

$$x^2 - x - 12 = 0$$

$$(x-4)(x+3) = 0$$

$$x = 4$$

$$x = -3$$

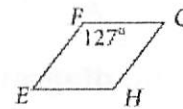
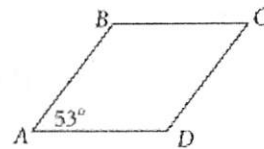
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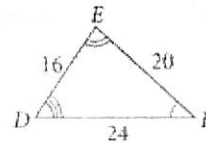
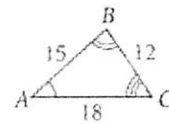
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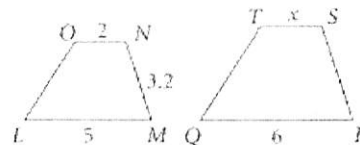
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$\frac{LM}{QR} = \frac{ON}{TS}$ Corresponding sides of ~ polygons are proportional.

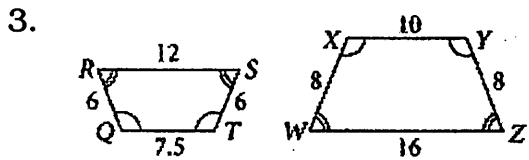
$$\frac{5}{6} = \frac{2}{x}$$

$5x = 12$ Cross-Product Property

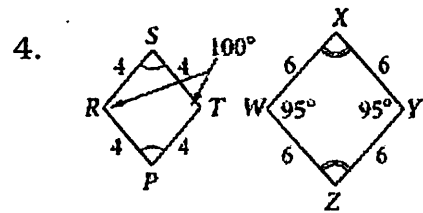
$$x = 2.4$$
 Solve for x .



Are the polygons similar? If they are, write a similarity statement and give the similarity ratio. If they are not, explain.

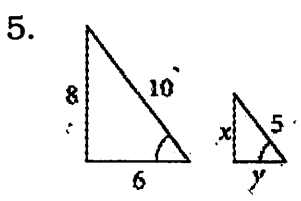


$RSTQ \sim ZWXY$
 $3:4$



NO!

The polygons are similar. Find the value of each variable.



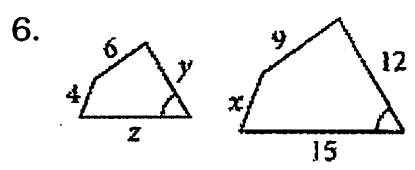
$\frac{8}{6} = \frac{4}{y}$ $8y = 24$

$y = 3$

$\frac{5}{10} = \frac{x}{8}$

$10x = 40$

$x = 4$



$\frac{y}{12} = \frac{6}{9}$

$y = 8$

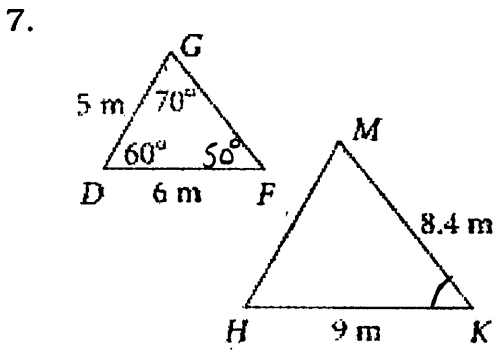
$\frac{x}{4} = \frac{9}{6}$

$x = 6$

$\frac{z}{15} = \frac{6}{9}$

$z = 10$

$\triangle DFG \sim \triangle HKM$. Use the diagram to find the following.



$m\angle F = 50^\circ$ $m\angle K = 50^\circ$ $m\angle M = 70^\circ$ $\frac{DF}{HK} = \frac{6}{9}$

$\frac{HM}{9} = \frac{5}{x}$

$6x = 45$

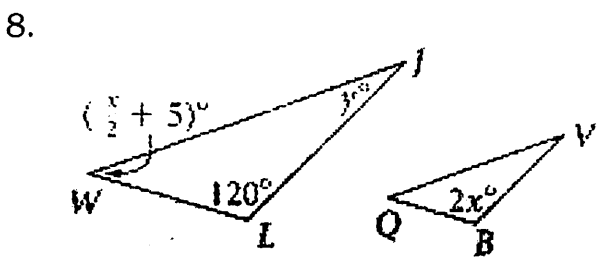
$x = 7.5$

$\frac{GF}{8.4} = \frac{6}{9} = \frac{x}{8.4}$ $9x = 50.4$

$x = 5.6$

The similarity ratio of $\triangle DFG$ to $\triangle HKM$ is 2:3

Find the value of the variables.



$\triangle WLJ \sim \triangle QBV$

$2x = 120$

$x = 60$

$y = 180 - 120 - 35$

$y = 25$

$\angle W = \frac{60}{2} + 5$

$\angle W = 35^\circ$