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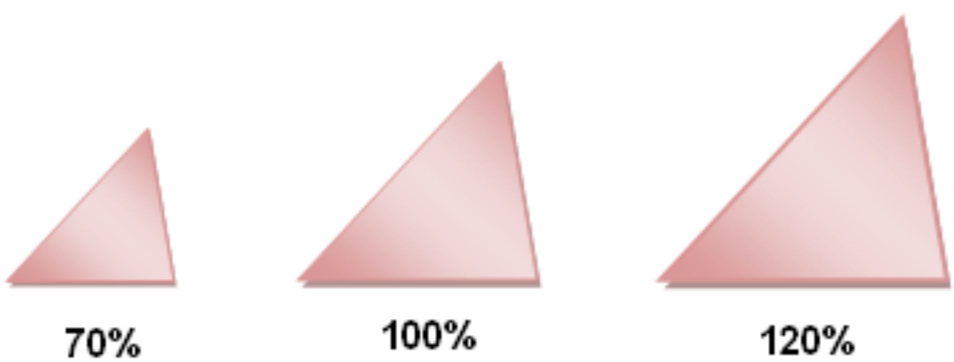
Chapter 7

Similar Polygons



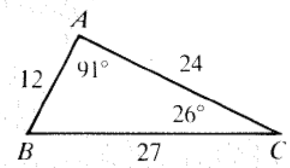
Q: Why were the similar triangles weighing themselves?
A: They were finding their scale.

7–1 Ratio and Proportion

ratio A ratio is the quotient of two numbers, $a \div b$, usually written as $\frac{a}{b}$ or $a:b$, $b \neq 0$. A ratio is usually expressed in **simplest form.**

Express each ratio in simplest form.

1. $AB:AC$
2. BC to AC
3. $\frac{BC}{AB}$
4. $\frac{m\angle C}{m\angle A}$
5. $m\angle B : m\angle C$



Ratios can be used to compare more than two numbers. To compare three or more numbers, the most convenient notation is *a:b:c*.

In Exercises 13–15 find the measure of each angle.

13. Two complementary angles have measures in the ratio 2 : 3.
14. Two supplementary angles have measures in the ratio 3 : 7.
15. The measures of the angles of a triangle are in the ratio 2 : 2 : 5.

proportion An equation that states that two ratios are equal is a proportion. The following are all proportions.

$\frac{a}{b} = \frac{c}{d}$ $a:b = c:d$ $\frac{3}{6} = \frac{1}{2}$ $3:6 = 1:2$

In $\frac{a}{b} = \frac{c}{d}$, a is the first term, b is the second term, c is the third term, and d is the fourth term of the proportion.

An **extended proportion** is an equation relating three or more ratios.

$\frac{a}{b} = \frac{c}{d} = \frac{e}{f}$ $\frac{3}{8} = \frac{x}{16} = \frac{y}{40}$

For each proportion, name (a) the first term, (b) the second term, (c) the third term, and (d) the fourth term.

18. $\frac{x}{7} = \frac{y}{8}$
19. $x:y = 7:3$
20. $\frac{2}{15} = \frac{x}{30}$

(a)	First			
(b)	Second			
(c)	Third			
(d)	Fourth			

31. The measures of the consecutive angles of a quadrilateral are in the ratio 5 : 7 : 11 : 13. Find the measure of each angle, draw a quadrilateral that satisfies the requirements, and explain why two sides must be parallel.

32. What is the ratio of the measure of an interior angle to the measure of an exterior angle in a regular hexagon? A regular decagon? A regular n-gon?

7–2 Properties of Proportions

The first and last terms of a proportion are called the **extremes.** The middle terms are called the **means.**

extreme → a / mean → b $=$ c ← mean / d ← extreme

$$\text{extreme} \rightarrow \frac{a}{b} = \frac{c}{d} \leftarrow \text{mean}$$

Properties of Proportions

~~Cross-multiplication:~~ not always useful for finding x.

Reciprocals: useful way to remove x from a denominator.

1. The product of the means is equal to the product of the extremes. This is called the **means-extremes** property of proportions. If $\frac{2}{3} = \frac{4}{6}$, then $2(6) = 3(4)$.
2. If you interchange the means, you get an equivalent proportion. If $\frac{2}{3} = \frac{4}{6}$, then $\frac{2}{4} = \frac{3}{6}$.
3. If you take the reciprocals of the ratios, the result is an equivalent proportion. If $\frac{2}{3} = \frac{4}{6}$, then $\frac{3}{2} = \frac{6}{4}$.
4. If you add 1 to both sides, you still have an equivalent proportion. If $\frac{2}{3} = \frac{4}{6}$, then $\frac{2+3}{3} = \frac{4+6}{6}$.
5. In an extended proportion, the ratio of the sum of all the numerators to the sum of all the denominators is equivalent to each of the original ratios. If $\frac{2}{3} = \frac{4}{6} = \frac{6}{9}$, then $\frac{2+4+6}{3+6+9} = \frac{2}{3} = \frac{4}{6} = \frac{6}{9}$.

Complete.

1. If $\frac{x}{5} = \frac{3}{2}$, then $2x =$ __?__.

2. If $\frac{x}{7} = \frac{y}{8}$, then $\frac{x+7}{7} =$ __?__.

3. If $\frac{8}{y} = \frac{3}{x}$, then $\frac{y}{8} =$ __?__.

4. If $\frac{7}{x} = \frac{3}{4}$, then $3x =$ __?__.

5. If $4:x = y:8$, then $8:x =$ __?__.

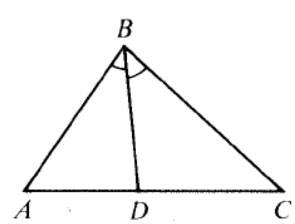
6. If $4:x = y:8$, then $xy =$ __?__.

Find the value of x. Line up equal signs vertically.

9. $\frac{x}{5} = \frac{2}{15}$ **10.** $\frac{14}{x} = \frac{10}{5}$ **11.** $\frac{3x}{4} = \frac{5}{8}$ **13.** $\frac{x+2}{12} = \frac{1}{2}$ **14.** $\frac{3}{4} = \frac{6}{x-5}$ **16.** $\frac{x-2}{x+1} = \frac{1}{4}$

$\frac{AD}{DC} = \frac{AB}{BC}$. **Complete the table.**

	AD	*DC*	*AC*	*AB*	*BC*
18.	4	6		8	
19.	8			16	18
20.			13	15	24



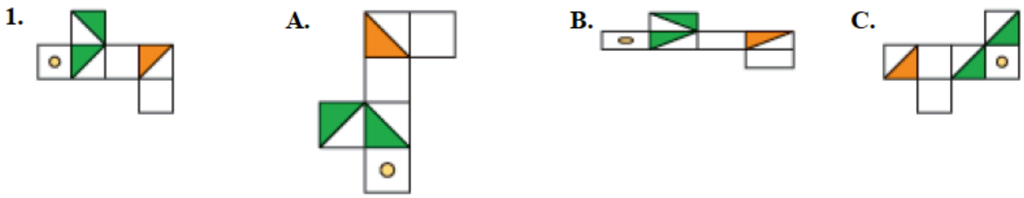
43. If $\frac{4a - 9b}{4a} = \frac{a - 2b}{b}$, find the numerical value of the ratio $a:b$.

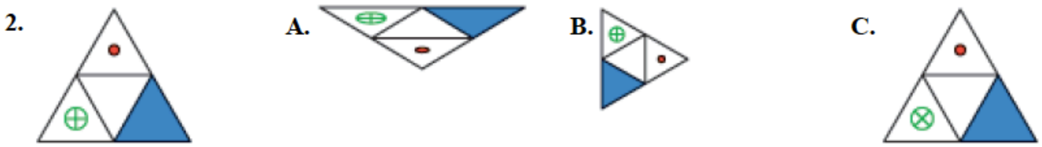
7–3 Similar Polygons

The symbol for similarity is the squiggle $\sim$

Similar figures have the same shape but not necessarily the same size.

Set A. For exercises 1 and 2, match the similar figures.

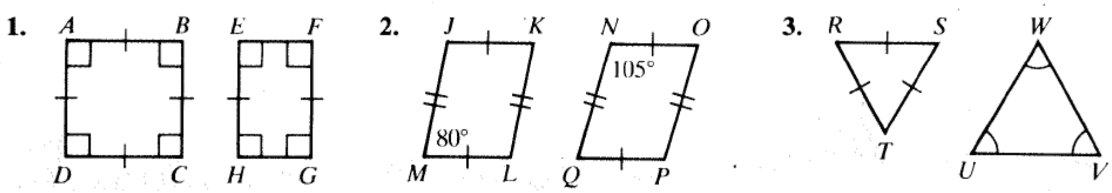




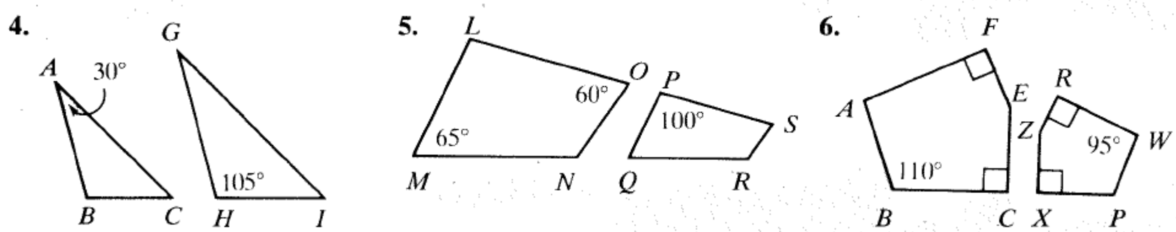
similar polygons	Two polygons are similar if their vertices can be paired so that corresponding angles are congruent and corresponding sides are in proportion.

Set B.

Are the polygons similar? If not, tell why not.

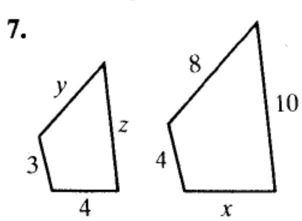


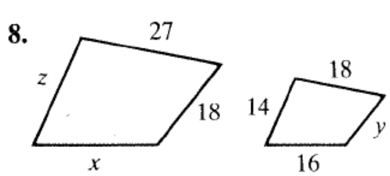
Two similar polygons are shown. Find the measure of each angle.



If two polygons are similar, then corresponding sides are in proportion. The ratio of the lengths of any two corresponding sides is called the **scale factor** of the similarity. One convenient way of labeling vertices of similar polygons is shown in Example 2. (A' is read "A prime.")

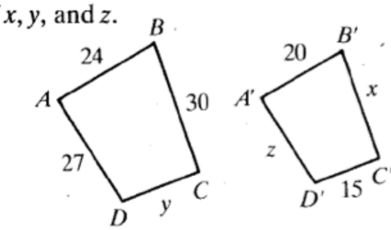
Two similar polygons are shown. Find the scale factor and the values of x, y, and z.





Example 2

Quad. $ABCD \sim$ quad. $A'B'C'D'$. Find the scale factor and the values of x, y, and z.



Solution

$\frac{AB}{A'B'} = \frac{24}{20} = \frac{6}{5}$ The scale factor is $\frac{6}{5}$.

$\frac{AB}{A'B'} = \frac{BC}{B'C'} = \frac{CD}{C'D'} = \frac{AD}{A'D'}$

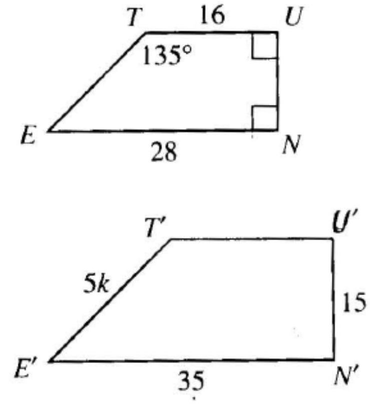
$\frac{6}{5} = \frac{30}{x} = \frac{y}{15} = \frac{27}{z}$

$\frac{6}{5} = \frac{30}{x}$ $\quad$ $\frac{6}{5} = \frac{y}{15}$ $\quad$ $\frac{6}{5} = \frac{27}{z}$

$6x = 5(30)$ $\quad$ $6(15) = 5y$ $\quad$ $6z = 5(27)$

$x = 25$ $\quad$ $18 = y$ $\quad$ $z = \frac{45}{2}$

10. $\triangle ABC \sim \triangle A'B'C'$. Their scale factor is 7:9. If the perimeter of $\triangle ABC$ is 42, then the perimeter of $\triangle A'B'C'$ is _?_.



In Exercises 15-23 quad. *TUNE* ~ quad. *T'U'N'E'*.

15. What is the scale factor of quad. *TUNE* to quad. *T'U'N'E'*?

16. What special kind of quadrilateral must quad. *T'U'N'E'* be? Explain.

17. Find $m\angle T'$.

18. Find $m\angle E'$.

19. Find *UN*.

20. Find *T'U'*.

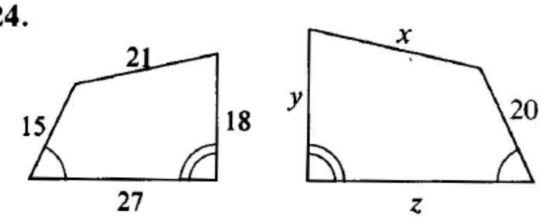
21. Find *TE*.

22. Find the ratio of the perimeters.

Nifty divider:

Two similar polygons are shown. Find the values of *x*, *y*, and *z*.

24.



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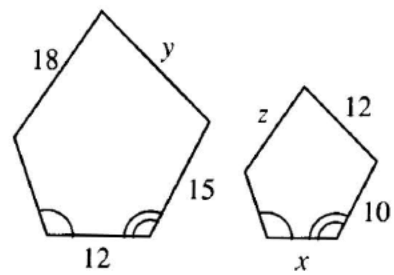

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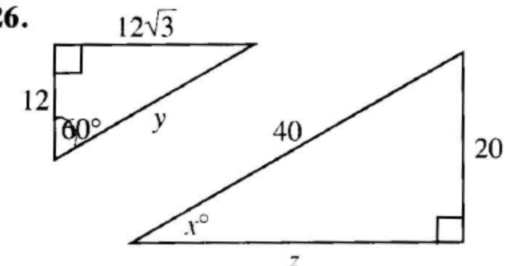

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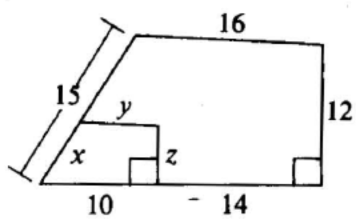
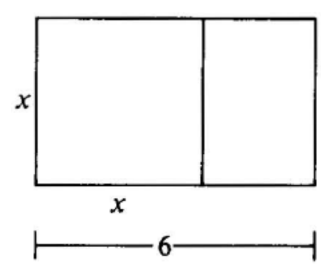


37. The large rectangle shown is a *golden rectangle*. This means that when a square is cut off, the rectangle that remains is similar to the original rectangle.

a. How wide is the original rectangle?

b. The ratio of length to width in a golden rectangle is called the *golden ratio*. Write the golden ratio in simplified radical form. Then use a calculator to find an approximation to the nearest hundredth.



Self-Test 1

Express the ratio in simplest form.

1. 9:15

2. 60 cm to 2 m

3. $\frac{4ab}{6b^2}$

Solve for *x*.

4. $\frac{x}{8} = \frac{9}{12}$

5. $\frac{x - 2}{2} = \frac{x + 6}{4}$

6. $\frac{x}{5 - x} = \frac{12}{8}$

Tell whether the equation is equivalent to the proportion $\frac{a}{b} = \frac{5}{7}$.

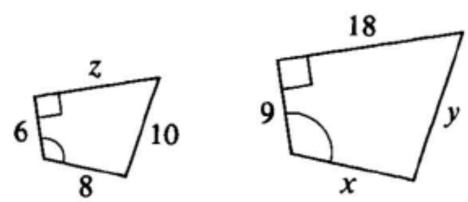
7. $\frac{a}{7} = \frac{b}{5}$

8. $7a = 5b$

9. $\frac{a + b}{b} = \frac{12}{7}$

10. If $\triangle ABC \sim \triangle RST$, $m\angle A = 45$, and $m\angle C = 60$, then $m\angle R =$ __?__, $m\angle T =$ __?__, and $m\angle S =$ __?__.

The quadrilaterals shown are similar.



11. The scale factor of the smaller quadrilateral to the larger quadrilateral is __?__.

12. $x =$ __?__ **13.** $y =$ __?__ **14.** $z =$ __?__

15. The measures of the angles of a hexagon are in the ratio 5:5:5:6:7:8. Find the measures.

Sheet 2011: Postulates

Postulate 1 **(Ruler Postulate)**

1. The points on a line can be paired with the real numbers in such a way that any two points can have coordinates 0 and 1.
2. Once a coordinate system has been chosen in this way, the distance between any two points equals the absolute value of the difference of their coordinates. (p. 12)

Postulate 2 **(Segment Addition Postulate)** If B is between A and C, then

$$AB + BC = AC. \qquad \text{(p. 12)}$$

Postulate 3 **(Protractor Postulate)** On $\overleftrightarrow{AB}$ in a given plane, choose any point O between A and B. Consider $\overrightarrow{OA}$ and $\overrightarrow{OB}$ and all the rays that can be drawn from O on one side of $\overleftrightarrow{AB}$. These rays can be paired with the real numbers from 0 to 180 in such a way that:

a. $\overrightarrow{OA}$ is paired with 0, and $\overrightarrow{OB}$ with 180.

b. If $\overrightarrow{OP}$ is paired with x, and $\overrightarrow{OQ}$ with y, then $m\angle POQ = |x - y|$. (p. 18)

Postulate 4 **(Angle Addition Postulate)** If point B lies in the interior of $\angle AOC$, then $m\angle AOB + m\angle BOC = m\angle AOC$. If $\angle AOC$ is a straight angle and B is any point not on $\overleftrightarrow{AC}$, then $m\angle AOB + m\angle BOC = 180$. (p. 18)

Postulate 5 A line contains at least two points; a plane contains at least three points not all in one line; space contains at least four points not all in one plane. (p.23)

Postulate 6 Through any two points there is exactly one line. (p. 23)

Postulate 7 Through any three points there is at least one plane, and through any three noncollinear points there is exactly one plane. (p. 23)

Postulate 8 If two points are in a plane, then the line that contains the points is in that plane. (p. 23)

Postulate 9 If two planes intersect, then their intersection is a line. (p. 23)

Postulate 10 If two parallel lines are cut by a transversal, then corresponding angles are congruent. (p. 78)

Postulate 11 If two lines are cut by a transversal and corresponding angles are congruent, then the lines are parallel. (p. 83)

Postulate 12 **(SSS Postulate)** If three sides of one triangle are congruent to three sides of another triangle, then the triangles are congruent. (p. 122)

Postulate 13 **(SAS Postulate)** If two sides and the included angle of one triangle are congruent to two sides and the included angle of another triangle, then the triangles are congruent. (p. 122)

Postulate 14 **(ASA Postulate)** If two angles and the included side of one triangle are congruent to two angles and the included side of another triangle, then the triangles are congruent. (p. 123)

Postulate 15 **(AA Similarity Postulate)** If two angles of one triangle are congruent to two angles of another triangle, then the triangles are similar. (p. 255)

Postulate 16 **(Arc Addition Postulate)** The measure of the arc formed by two adjacent arcs is the sum of the measures of these two arcs. (p. 339)

Postulate 17 The area of a square is the square of the length of a side. ($A = s^2$) (p. 423)

Postulate 18 **(Area Congruence Postulate)** If two figures are congruent, then they have the same area. (p. 423)

Postulate 19 **(Area Addition Postulate)** The area of a region is the sum of the areas of its non-overlapping parts. (p. 424)

7–4 & 7–5 The AA Similarity Postulate and SAS/SSS Similarity Theorems

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

Postulate 15

Set A. Are the triangles similar? If you can't reach a conclusion, write *no conclusion is possible*.

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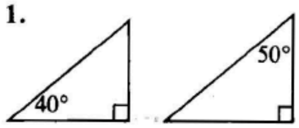

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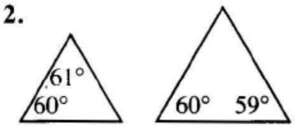

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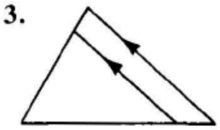

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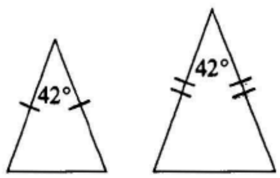

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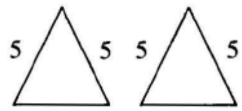

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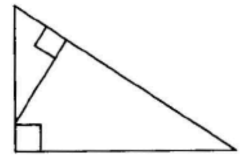

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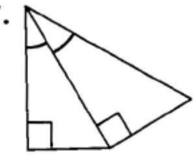

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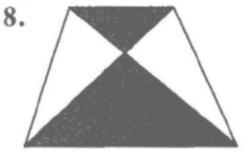
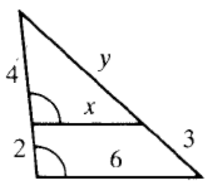


Trapezoid given

Set B. Find the values of *x* and *y*. Hints: re-draw triangles; use ll lines to find angles.

7.



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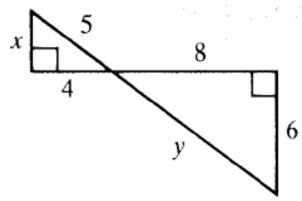

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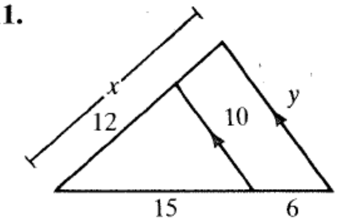
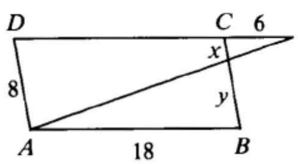


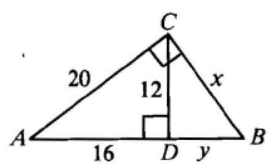
***ABCD* is a parallelogram.**
Find the values of *x* and *y*.

19.

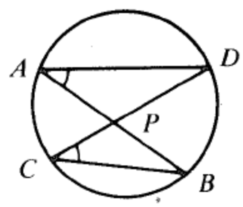


14. a. Name two triangles that are similar to $\triangle ABC$.

b. Find the values of x and y.



14'.



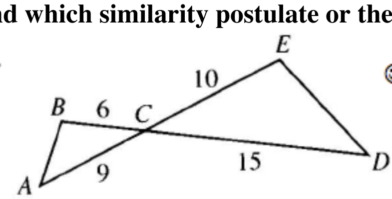
Given: $\overline{AB}$ and $\overline{CD}$ intersect at P; $\angle DAB \cong \angle DCB$

Prove: $AP \cdot PB = CP \cdot PD$

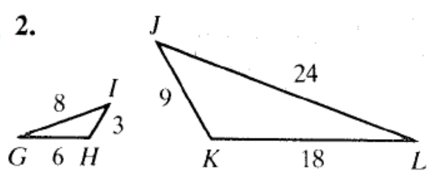
SAS Similarity Theorem (7–1) If an angle of one triangle is congruent to an angle of another triangle and the sides including those angles are in proportion, then the triangles are similar.	
SSS Similarity Theorem (7–2) If the sides of two triangles are in proportion, then the triangles are similar.	

Set C. Can the two triangles shown be proved similar? If so, state the similarity and which similarity postulate or theorem you would correctly use.

1.



☺ **2.**



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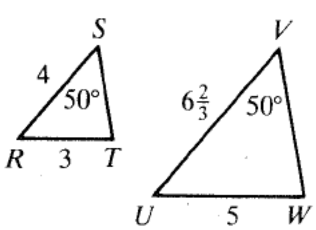

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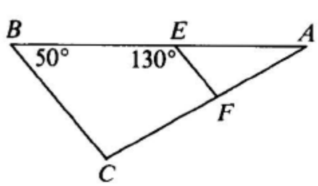
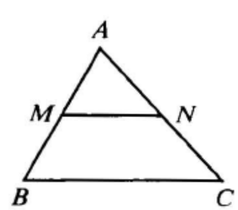


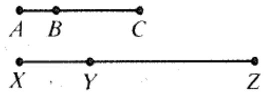


22. Prove the Midsegment Thm (5–11).

Given: M is the midpoint of $\overline{AB}$; N is the midpoint of $\overline{AC}$.

Prove: $\overline{MN} \parallel \overline{BC}$; $MN = \frac{1}{2}BC$

7–6 Proportional Lengths



If $\frac{AB}{BC} = \frac{XY}{YZ}$, then $\overline{AC}$ and $\overline{XZ}$ are said to be **divided proportionally.**

Triangle Proportionality Theorem	**If a line parallel to one side of a triangle intersects the other two sides, then it divides those sides proportionally.**

Theorem 7–3

Side-Splitter Theorem

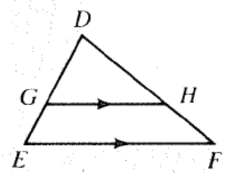
There are many equivalent proportions. Most exercises can be done more than one way.

$\frac{DG}{GE} = \frac{DH}{HF}$ $\quad \frac{\text{larger piece}}{\text{smaller piece}} = \frac{\text{larger piece}}{\text{smaller piece}}$

$\frac{GE}{DE} = \frac{HF}{DF}$ $\quad \frac{\text{smaller piece}}{\text{whole side}} = \frac{\text{smaller piece}}{\text{whole side}}$

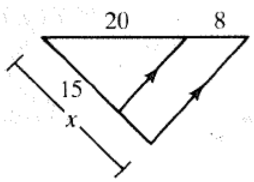
$\frac{DG}{DE} = \frac{DH}{DF}$ $\quad \frac{\text{larger piece}}{\text{whole side}} = \frac{\text{larger piece}}{\text{whole side}}$

$\frac{GE}{HF} = \frac{DG}{DH} = \frac{DE}{DF}$ $\quad \frac{\text{smaller piece}}{\text{smaller piece}} = \frac{\text{larger piece}}{\text{larger piece}} = \frac{\text{whole side}}{\text{whole side}}$



Example 1

Find the value of x.



Solution

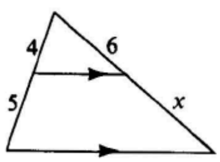
$$\frac{x}{15} = \frac{28}{20} \qquad \left(\text{or } \frac{15}{x-15} = \frac{20}{8}\right)$$

$$20x = 15(28)$$

$$x = 21$$

Find the value of *x*.

3.



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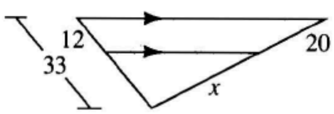

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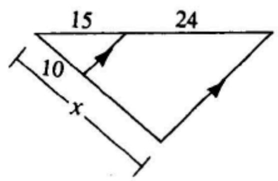

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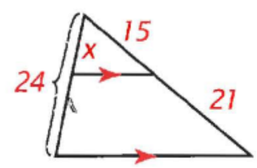

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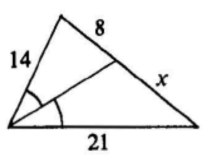

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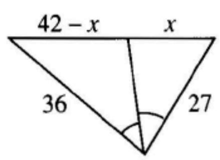

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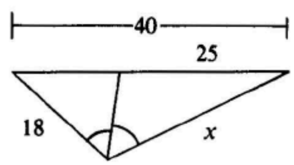
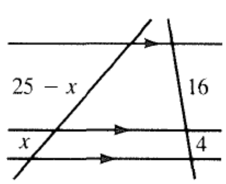


Corollary to Thm 7–3. If three parallel lines intersect two transversals, then they divide the transversals proportionally.

Example 2

Find the value of x.



Solution

$$\frac{4}{16} = \frac{x}{25 - x}$$

$$\frac{1}{4} = \frac{x}{25 - x}$$

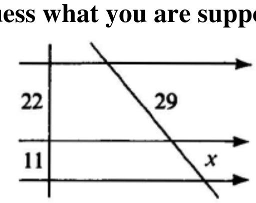
$$25 - x = 4x$$

$$25 = 5x$$

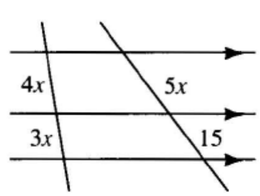
$$x = 5$$

Guess what you are supposed to do and then do it.

9.



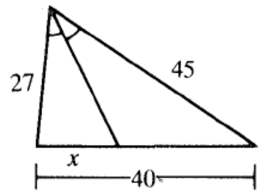
11.



Triangle Angle-Bisector Theorem	**If a ray bisects an angle of a triangle, then it divides the opposite side into segments proportional to the other two sides.**	Theorem 7–4

Example 3

Find the value of x.

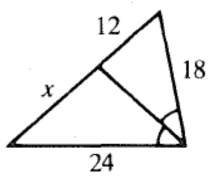


Solution

$$\frac{x}{40-x} = \frac{27}{45}$$
$$\frac{x}{40-x} = \frac{3}{5}$$
$$5x = 120 - 3x$$
$$8x = 120$$
$$x = 15$$

Find the value of x.

10.



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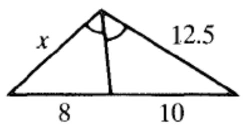

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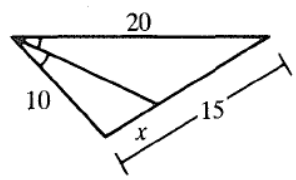
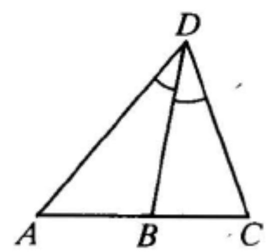


Complete.



20. $AD = 21$, $DC = 14$, $AC = 25$, $AB = \underline{\ ?\ }$

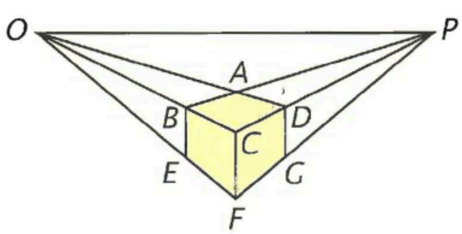
21. $AC = 60$, $CD = 30$, $AD = 50$, $BC = \underline{\ ?\ }$

22. $AB = 27$, $BC = x$, $CD = \frac{4}{3}x$, $AD = x$, $AC = \underline{\ ?\ }$

23. $AB = 2x - 12$, $BC = x$, $CD = x + 5$, $AD = 2x - 4$, $AC = \underline{\ ?\ }$

Two-Point Perspective. The figure below is a two-dimensional picture of a cube drawn in "two-point perspective."*

In the figure, BC = CD, EF = FG, and BE ∥ CF ∥ DG.



Tell whether each of the following conclusions seems reasonable. In each case, explain why or why not.

22. $\frac{OB}{BC} = \frac{OE}{EF}$.

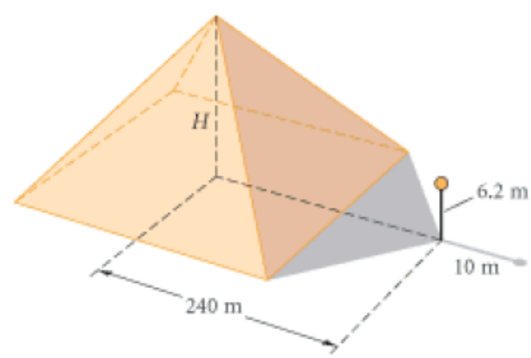
23. $\frac{PA}{AB} = \frac{PD}{DC}$.

24. $\frac{BC}{EF} = \frac{CD}{FG}$.

25. $\frac{PD}{PC} = \frac{PG}{PF}$.

**Perspective in Perspective*, by Lawrence Wright (Routledge and Kegan Paul, 1983).

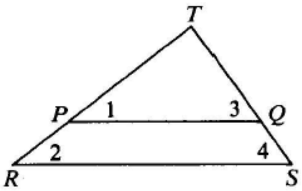
6. While vacationing in Egypt, the Greek mathematician Thales calculated the height of the Great Pyramid. According to legend, Thales placed a pole at the tip of the pyramid's shadow and used similar triangles to calculate its height. This involved some estimating because he was unable to measure the distance from directly beneath the height of the pyramid to the tip of the shadow. From the diagram, explain his method. Calculate the height of the pyramid from the information given in the diagram.



18'. Prove the Triangle Proportionality Theorem.

Given: $\triangle RST$; $\overleftrightarrow{PQ} \parallel \overline{RS}$

Prove: $\frac{RP}{PT} = \frac{SQ}{QT}$



Statements	Reasons
1. $\overleftrightarrow{PQ} \parallel \overline{RS}$	1. ?
2. $\angle 1 \cong \angle 2$; $\angle 3 \cong \angle 4$	2. ?
3. $\triangle RST \sim \triangle PQT$	3. ?
4. $\frac{RT}{PT} = \frac{ST}{QT}$	4. Corr. sides of ~ $\triangle$s are in proportion.
5. $RT = RP + PT$; $ST = SQ + QT$	5. ?
6. $\frac{RP + PT}{PT} = \frac{SQ + QT}{QT}$	6. ?
7. $\frac{RP}{PT} = \frac{SQ}{QT}$	7. A property of proportions

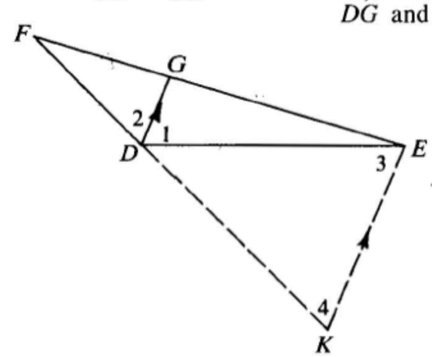
18. Prove the corollary of the Triangle Proportionality Theorem.

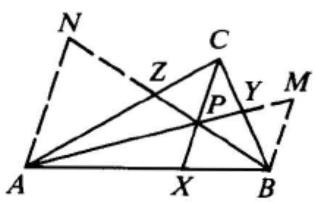
19. Prove the Triangle Angle-Bisector Theorem.

Given: $\triangle DEF$; $\overrightarrow{DG}$ bisects $\angle FDE$.

Prove: $\frac{GF}{GE} = \frac{DF}{DE}$

Draw a line through E parallel to $\overrightarrow{DG}$ and intersecting $\overrightarrow{FD}$ at K.





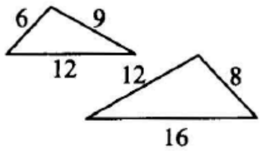
33. Prove *Ceva's Theorem:* If P is any point inside $\triangle ABC$, then $\frac{AX}{XB} \cdot \frac{BY}{YC} \cdot \frac{CZ}{ZA} = 1$.

(*Hint:* Draw lines parallel to $\overline{CX}$ through A and B. Apply the Triangle Proportionality Theorem to $\triangle ABM$. Show that $\triangle APN \sim \triangle MPB$, $\triangle BYM \sim \triangle CYP$, and $\triangle CZP \sim \triangle AZN$.)

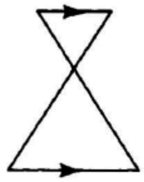
Self-Test 2

State the postulate or theorem you can use to prove that two triangles are similar.

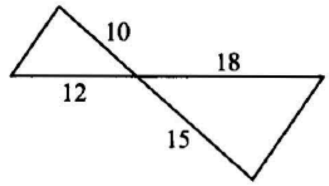
1.



2.



3.



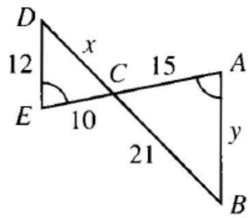
4. Complete.

a. $\triangle ABC \sim$ __?__

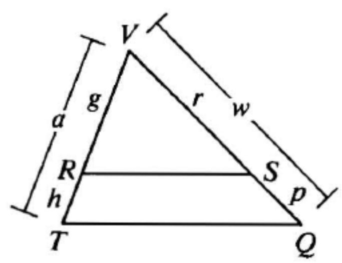
b. $\dfrac{AB}{?} = \dfrac{AC}{?} = \dfrac{BC}{?}$

c. $\dfrac{15}{?} = \dfrac{21}{?}$, and $x =$ __?__

d. $\dfrac{15}{?} = \dfrac{?}{12}$, and $y =$ __?__



In the figure, it is given that $\overline{RS} \parallel \overline{TQ}$. Complete each proportion.



5. $\dfrac{g}{h} = \dfrac{?}{p}$

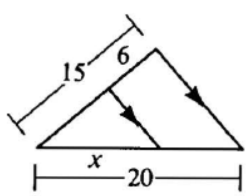
6. $\dfrac{a}{h} = \dfrac{w}{?}$

7. $\dfrac{r}{g} = \dfrac{p}{?}$

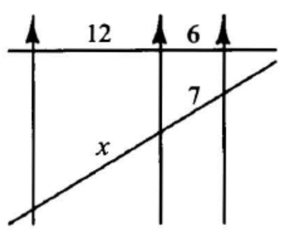
8. $\dfrac{h}{p} = \dfrac{?}{w}$

Find the value of x.

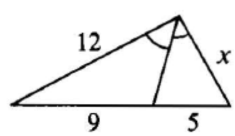
9.



10.



11.



Chapter Review

4. The measures of the angles of a triangle are in the ratio 4:4:7. Find the three measures.

Is the equation equivalent to the proportion $\frac{30 - x}{x} = \frac{8}{7}$?

5. $7x = 8(30 - x)$ **6.** $\frac{x}{30 - x} = \frac{7}{8}$ **7–2**

7. $8x = 210 - 7x$ **8.** $\frac{30}{x} = \frac{15}{7}$

9. If $\triangle ABC \sim \triangle NJT$, then $\angle B \cong$ __?__. **7–3**

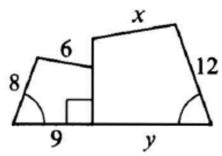
10. If quad. $DEFG \sim$ quad. $PQRS$, then $\frac{FG}{RS} = \frac{GD}{?}$.

11. $\triangle ABC \sim \triangle JET$, and the scale factor of $\triangle ABC$ to $\triangle JET$ is $\frac{5}{3}$.

a. If $BC = 20$, then $ET =$ __?__.

b. If the perimeter of $\triangle JET$ is 30, then the perimeter of $\triangle ABC$ is __?__.

12. The quadrilaterals are similar. Find the values of x and y.



13. a. $\triangle RTS \sim$ __?__ **7–4**

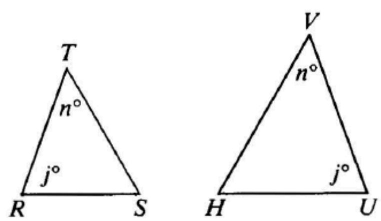
b. What postulate or theorem justifies the statement in part (a)?

14. $\frac{RT}{?} = \frac{TS}{?} = \frac{RS}{?}$

15. Suppose you wanted to prove

$$RS \cdot UV = RT \cdot UH.$$

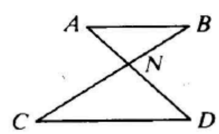
You would first use similar triangles to show that $\frac{RS}{?} = \frac{?}{?}$.



Can the two triangles be proved similar? If so, state the similarity and the postulate or theorem you would use. If not, write *no*.

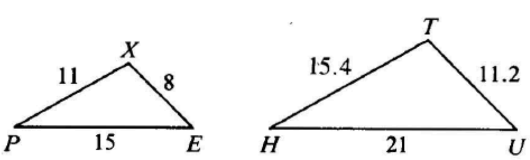
16. $\angle A \cong \angle D$ **17.** $\angle B \cong \angle D$ **7–5**

18. $CN = 16$, $ND = 14$, $BN = 7$, $AN = 8$ **19.** $AN = 7$, $AB = 13$, $DN = 14$, $DC = 26$



Exs. 16–19

20.

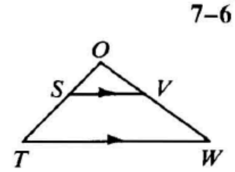


21. Which proportion is *incorrect*? **7–6**

(1) $\frac{OS}{ST} = \frac{OV}{VW}$ (2) $\frac{SV}{TW} = \frac{OS}{ST}$ (3) $\frac{OT}{OW} = \frac{OS}{OV}$

22. If $OS = 8$, $ST = 12$, and $OV = 10$, then $OW =$ __?__.

23. If $OS = 8$, $ST = 12$, and $OW = 24$, then $VW =$ __?__.



24. In $\triangle ABC$, the bisector of $\angle B$ meets $\overline{AC}$ at K. $AB = 18$, $BC = 24$, and $AC = 28$. Find AK.

Answers

Self-Test 1

1. 3:5 **2.** 3 to 10 **3.** $\frac{2a}{3b}$ **4.** 6 **5.** 10 **6.** 3 **7.** No **8.** Yes **9.** Yes **10.** 45, 60, 75

11. 2:3 **12.** 12 **13.** 15 **14.** 12 **15.** 100, 100, 100, 120, 140, 160

Self-Test 2

1. SSS ~ **2.** AA ~ **3.** SAS ~ **4.** **a.** $\triangle EDC$ **b.** ED; EC; DC **c.** 10; x; 14 **d.** 10; y; 18 **5.** r

6. p **7.** h **8.** a **9.** 12 **10.** 14 **11.** $6\frac{2}{3}$

Chapter 7 Review

5. No **7.** Yes **9.** $\angle J$ **11.** **a.** 12 **b.** 50 **13.** **a.** $\triangle UVH$ **b.** AA ~

15. UH; $\frac{RT}{UV}$ **17.** $\triangle NCD \sim \triangle NAB$; AA ~ **19.** No **21.** 2 **23.** 14.4