

September 10, 2018

What are the scale factors for the following figures??

How do you know?

$(2,3) \times 2 = (4,6)$  Scale factor

$(4,4) \times \frac{1}{2} = (2,2)$  Scale factor

Sep 6-9:58 AM

Triangle Midsegment Theorem

p 341 Read and copy the Triangle Midsegment Theorem

Draw a picture of what you think the Triangle Midsegment is describing...

midpoint  $\rightarrow$  parallel Midsegment!

$DE = \frac{1}{2} BC$   
 $2DE = BC$

Sep 6-9:59 AM

p342

Your Turn

6. Find JL, PM, and  $m\angle MLK$ .

$JL = 2PN = 2(39) = 78$   
 $PM = \frac{1}{2} KL = \frac{1}{2}(95) = 47.5$

Elaborate

7. Discussion Explain why  $\overline{XY}$  is NOT a midsegment of the triangle.

$XY$  is not at the midpoint.

8. Essential Question Check-In Explain how the perimeter of  $\triangle DEF$  compares to that of  $\triangle ABC$ .

The perimeter of  $\triangle DEF$  is  $\frac{1}{2}$  the perimeter of  $\triangle ABC$ .

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p343

find each measure.

4.  $XY = \frac{1}{2}(15.8) = 7.9$   
5.  $AX = 4.6$   
6.  $m\angle BXY = 180 - 69 = 111$   
7.  $BZ = \frac{1}{2}(15.8)$   
8.  $m\angle YZC = 68^\circ$

Algebra Find the value of  $n$  in each triangle.

11.  $2 \cdot \text{midsegment} = \text{the parallel side}$   
 $2(n) = 48$   
 $n = 24$

12.  $2(n+2) = 6n$   
 $2n + 4 = 6n$   
 $-2n$   
 $4 = 4n$   
 $n = 1$

13.  $2(11.3) = n + 4.2$   
 $22.6 = n + 4.2$   
 $-4.2$   
 $18.4 = n$

14.  $2(4n+9) = 14n$   
 $8n + 18 = 14n$   
 $-8n$   
 $18 = 6n$   
 $3 = n$

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15. Line segment  $\overline{XY}$  is a midsegment of  $\triangle MNP$ . Determine whether each of the following statements is true or false.

3 trues, 3 falses

a.  $MP = 2XY$  false  $\checkmark$   
b.  $MP = \frac{1}{2}XY$  false  $\checkmark$   
c.  $MX = XN$  true  $\checkmark$   
d.  $MX = \frac{1}{2}NX$  true  $\checkmark$   
e.  $NX = \frac{1}{2}YN$  true  $\checkmark$   
f.  $XY = \frac{1}{2}MP$  true  $\checkmark$

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Triangle Midsegment

Date \_\_\_\_\_ Period \_\_\_\_\_

In each triangle, M, N, and P are the midpoints of the sides. Name a segment parallel to the one given.

1)  $KI \parallel \overline{MN}$  parallel  $\checkmark$

2)  $MN \parallel \overline{EG}$

3)  $CD \parallel \overline{MP}$

4)  $PM \parallel \overline{EF}$

Find the missing length indicated.

5) Find TU:  $\frac{1}{2}(22) = 11$

6) Find PR:  $2(2) = 4$

7) Find EX: 6

8) Find ZR: 10

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Solve for x:

9)  $2(2x-9) = x+12$   
 $4x-18 = x+12$   
 $-x = -6$   
 $x = 6$

10)  $2(2x-9) = 2x$   
 $4x-18 = 2x$   
 $-2x = -18$   
 $x = 9$

11)  $2(2x-9) = x+3$   
 $4x-18 = x+3$   
 $-x = -12$   
 $x = 12$

12)  $2(x+16) = x+24$   
 $2x+32 = x+24$   
 $x = -8$

13) Find  $PR$   $2(x+20) = x+30$   
 $2x+40 = x+30$   
 $-x = -10$   
 $x = 10$   
 $PR = x+30 = 40$

14) Find  $KJ$   $2(x-12) = x+16$   
 $2x-24 = x+16$   
 $-x = -40$   
 $x = 40$   
 $KJ = x = 40$

15) Find  $PR$   $2(2x+10) = x+14$   
 $4x+20 = x+14$   
 $-x = -6$   
 $x = 6$   
 $PR = x+14 = 20$

16) Find  $PR$   $2(x+6) = x+5$   
 $2x+12 = x+5$   
 $-x = -7$   
 $x = 7$   
 $PR = x = 7$

Sep 6-10:11 AM

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Find y.

Find x and the length of AB.

Sep 6-10:07 AM

Parallelogram vocabulary

Define the following words and draw a picture

- quadrilateral
- parallelogram
- diagonal

Sep 6-10:08 AM

### Properties of parallelograms

One special kind of polygons is called a parallelogram. It is a quadrilateral where both pairs of opposite sides are parallel.

There are six important properties of parallelograms to know:

- Opposite sides are congruent ( $AB = DC$ ),  $AD = BC$ .
- Opposite angles are congruent ( $D = B$ ),  $A = C$ .
- Consecutive angles are supplementary ( $A + D = 180^\circ$ ),  $C + B = 180^\circ$ ,  $B + A = 180^\circ$ ,  $D + C = 180^\circ$ .
- If one angle is right, then all angles are right.
- The diagonals of a parallelogram bisect each other.
- Each diagonal of a parallelogram separates it into two congruent triangles:  $\triangle AEB \cong \triangle CED$ ,  $\triangle AED \cong \triangle CEB$ .

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p 363 copy theorems  
 p 364 copy theorem

p368 10-13

A staircase handrail is made from congruent parallelograms. In  $\square PQRS$ ,  $PQ = 17.5$ ,  $ST = 18$ , and  $m\angle QRS = 110^\circ$ . Find each measure. Explain.

10.  $RS = 17.5$

11.  $QT = 18$

12.  $m\angle PQR$   $\angle PQR + \angle QRS = 180^\circ$   
 $\angle PQR + 110 = 180$   
 $-110$   
 $\angle PQR = 70$

13.  $m\angle SPQ$   $\rightarrow = 110$

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p 371 copy theorem  
 p 372 copy theorems  
 p 373 copy theorem

p 378

Show that each quadrilateral is a parallelogram for the given values of the variables.

5.  $x = 4$  and  $y = 9$

6.  $u = 8$  and  $v = 3.5$

Determine if each quadrilateral must be a parallelogram. Justify your answer.

7.  $AM \parallel BE$ ,  $MB \parallel EA$ . Yes, AO.

8.  $AD \parallel BE$ ,  $DE \parallel AB$ . Yes, AO.

9.  $AM \parallel BE$ ,  $MB \parallel EA$ . No, JG.

10.  $AD \parallel BE$ ,  $DE \parallel AB$ . No, JG.

11.  $AM \parallel BE$ ,  $MB \parallel EA$ . Yes, SF, Col.

12.  $AD \parallel BE$ ,  $DE \parallel AB$ . Yes, SF, Col.

Sep 6-10:16 AM

Parallelograms  
Solve for  $x$ . Each figure is a parallelogram.

1)  $46x - 3 = 135$   
 $46x = 138$   
 $x = 3$

2)  $x = 6$

3)  $x = 7$

4)  $x = 3$

5)  $x = 3$

6)  $x = 9$

7)  $x = 14$

8)  $x = 3$

9)  $x = 2$

10)  $x = 5$

TRY 3!

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11) Find  $m\angle D$

12) Find  $m\angle D$

13) Find  $CD$   $x+6 = 2x-5$   
 $-x = -11$   
 $x = 11$

14) Find  $m\angle D$   $13 + 15x$   
 $1 + 9x = 13 + 15x$   
 $-1 + 9x + 13 + 15x = 180$   
 $12 + 24x = 180$   
 $-12$   
 $24x = 168$   
 $24$   
 $x = 7$

15) Find  $RS$   $11 = x$   
 $2(11) - 5 = 17$

16) Find  $m\angle X$   $x + 67$   
 $2x + 67$

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14) Find  $m\angle D$   $\angle E = \angle C$   
 $1 + 9x = 13 + 15x$   
 $\angle A + \angle D = 180$   
 $-1 + 9x + 13 + 15x = 180$   
 $12 + 24x = 180$   
 $-12$   
 $24x = 168$   
 $24$   
 $x = 7$

16) Find  $m\angle X$   $2x + 67 = x + 67$   
 $-x = -x$   
 $x + 67 = 67$   
 $-67 = -67$   
 $x = 0$   
 $m\angle X = x + 67$   
 $m\angle X = 0 + 67$   
 $m\angle X = 67$

Sep 11-11:46 AM

### Objectives

Prove certain triangles are similar by using AA, SSS, and SAS.

Use triangle similarity to solve problems.

**Postulate 7-3-4 Angle-Angle (AA) Similarity**

POSTULATE	HYPOTHESIS	CONCLUSION
If two angles of one triangle are congruent to two angles of another triangle, then the triangles are similar.		$\triangle ABC \sim \triangle DEF$

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**Theorem 7-3-2 Side-Side-Side (SSS) Similarity**

THEOREM	HYPOTHESIS	CONCLUSION
If the three sides of one triangle are proportional to the three corresponding sides of another triangle, then the triangles are similar.		$\triangle ABC \sim \triangle DEF$

**Theorem 7-3-3 Side-Angle-Side (SAS) Similarity**

THEOREM	HYPOTHESIS	CONCLUSION
If two sides of one triangle are proportional to two sides of another triangle and their included angles are congruent, then the triangles are similar.		$\triangle ABC \sim \triangle DEF$

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Are the triangles similar by AA, SAS or SSS?

sides using proportions or fractions

Verify that the triangles are similar.

$\triangle PQR$  and  $\triangle STU$

$\frac{PQ}{ST} = \frac{3}{4.5} = \frac{2}{3} = .67$   
 $\frac{QR}{TU} = \frac{3}{4.5} = \frac{2}{3} = .67$   
 $\frac{PR}{SU} = \frac{2}{3} = .67$

Therefore  $\triangle PQR \sim \triangle STU$  by **SSS**

Example 1: Using the **AA** Similarity Postulate

Explain why the triangles are similar and write a similarity statement.

$\angle A = \angle D = 90^\circ$   
 Vertical Angles  $\rightarrow \angle BCA = \angle ECD$

Verify that the triangles are similar.

$\triangle DEF$  and  $\triangle HJK$

$\angle D = \angle H$  by the Definition of Congruent Angles.

$\frac{DE}{HJ} = \frac{2}{1} = 2$   $\frac{DF}{HK} = \frac{5.8}{2.9} = 2$

Therefore  $\triangle DEF \sim \triangle HJK$  by **SAS**

Sep 12-8:30 AM

AA, SAS, or SSS similarity & how do you know?

SAS

proportions  
left  $\frac{12}{16} = .75$   
right  $\frac{15}{20} = .75$   $\angle X = \angle X$

SAS

left  $\frac{2}{5.8} = 2$   
right  $\frac{1}{2.9} = 2$   
 $70 = 70$

AA

$\angle B = \angle E$   
 $\angle A = \angle D$

$180 = D + 90 + 47$   
 $180 = D + 137$   
 $-137$        $-137$   
 $43 = D$

Sep 12-8:31 AM

Geometry Name: \_\_\_\_\_ ID: 1  
Triangle Similarity, AA, SAS, SSS using proportions Date: \_\_\_\_\_ Period: \_\_\_\_\_

Find the missing length indicated. Leave your answer in simplest radical form.

proportions

hyp  $\frac{x}{36} = \frac{100}{x}$   
leg  $\frac{36}{x} = \frac{100}{x}$   
 $x^2 = 3600$   
 $x = 60$

hyp  $\frac{x}{30} = \frac{100}{x}$   
leg  $\frac{30}{x} = \frac{100}{x}$   
 $x^2 = 3000$   
 $x = 10\sqrt{30}$

State if the triangles in each pair are similar. If so, state how you know they are similar and complete the similarity statement.

AA, SAS, SSS

$\triangle PQR \sim \triangle PRQ$  SAS

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9)

10)

Solve for x. The triangles in each pair are similar.

11)  $\triangle DEF \sim \triangle DBA$

12)

Find the missing length. The triangles in each pair are similar.

13)  $\triangle LMN \sim \triangle LSR$

14)  $\triangle JKL \sim \triangle CDE$

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p 384 property of rectangles  
p 385 property of rhombuses

p 388

Find the lengths using rectangle ABCD.

- $AB = 21$ ;  $AD = 28$ . What is the value of  $AC + BD$ ?
- $BC = 40$ ;  $CD = 30$ . What is the value of  $BD - AC$ ?

4. An artist connects stained glass pieces with lead strips. In this rectangular window, the strips are cut so that  $FH = 34$  in. Find  $JG$ . Explain.

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The rectangular gate has diagonal braces. Find each length.

- Find  $HJ$ .
- Find  $HK$ .

- Find the measure of each numbered angle in the rectangle.

Sep 6-10:27 AM

p 395 theorem  
p 396 theorems

p399-400

Determine whether each quadrilateral must be a rectangle. Explain.


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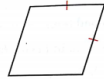
Given:  $BD = AC$

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
p 400

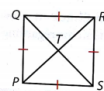
Each quadrilateral is a parallelogram. Determine whether each parallelogram is a rhombus or not.

5. 

6. 

Give one characteristic about each figure that would make the conclusion valid.

7. Conclusion:  $JKLM$  is a rhombus. 

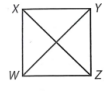
8. Conclusion:  $PQRS$  is a square. 

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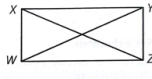
p 401

In Exercises 13–16, Determine which quadrilaterals match the figure: parallelogram, rhombus, rectangle, or square? List all that apply.

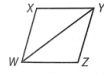
13. Given:  $\overline{XY} \cong \overline{ZW}$ ,  $\overline{XY} \parallel \overline{ZW}$ ;  $\overline{WY} \cong \overline{XZ}$ ,  $\overline{WY} \perp \overline{XZ}$



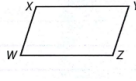
14. Given:  $\overline{XY} \cong \overline{ZW}$ ,  $\overline{XW} \cong \overline{ZY}$ ,  $\overline{WY} \cong \overline{XZ}$



15. Given:  $\angle WXY \cong \angle YZW$ ,  $\angle XWZ \cong \angle ZYX$ ,  $\angle XWY \cong \angle YWZ$ ,  $\angle XYW \cong \angle ZYW$



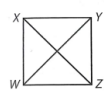
16. Given:  $m\angle WXY = 130^\circ$ ,  $m\angle XWZ = 50^\circ$ ,  $m\angle WZY = 130^\circ$



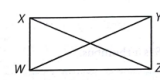
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In Exercises 13–16, Determine which quadrilaterals match the figure: parallelogram, rhombus, rectangle, or square? List all that apply.

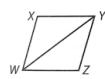
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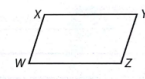
14. Given:  $\overline{XY} \cong \overline{ZW}$ ,  $\overline{XW} \cong \overline{ZY}$ ,  $\overline{WY} \cong \overline{XZ}$



15. Given:  $\angle WXY \cong \angle YZW$ ,  $\angle XWZ \cong \angle ZYX$ ,  $\angle XWY \cong \angle YWZ$ ,  $\angle XYW \cong \angle ZYW$



16. Given:  $m\angle WXY = 130^\circ$ ,  $m\angle XWZ = 50^\circ$ ,  $m\angle WZY = 130^\circ$



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Quadrilateral G.O.

### Quadrilaterals – Properties Chart

Complete the properties chart for each quadrilateral. Tell how many and which angles or sides fit each description. Tell the characteristics of the diagonals for each quadrilateral.

Figure	Congruent Angles	Congruent Sides	Parallel Sides	Diagonals
Parallelogram				
Rectangle				
Rhombus				
Square				
Trapezoid				
Isosceles Trapezoid				
Kite				

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### Quadrilaterals – Flow Chart

Complete the flow chart with the name of the appropriate quadrilateral. Include a diagram to represent each quadrilateral.

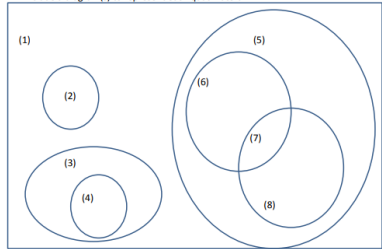
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    graph TD
      A[Quadrilateral ABCD] --> B[If 2 pair opposite sides are parallel, ABCD is a (1)]
      A --> C[If 1 pair opposite sides are parallel, ABCD is a (2)]
      A --> D[If no opposite sides are parallel, ABCD is a (3)]
      B --> E[If diagonals are congruent, ABCD is a (4)]
      B --> F[If diagonals are perpendicular, ABCD is a (5)]
      C --> G[If diagonals are congruent, ABCD is a (6)]
      D --> H[If two pair consecutive sides are congruent, ABCD is a (7)]
      E --> I[If diagonals are both = and ⊥, ABCD is a (8)]
      F --> I
      G --> I
  
```

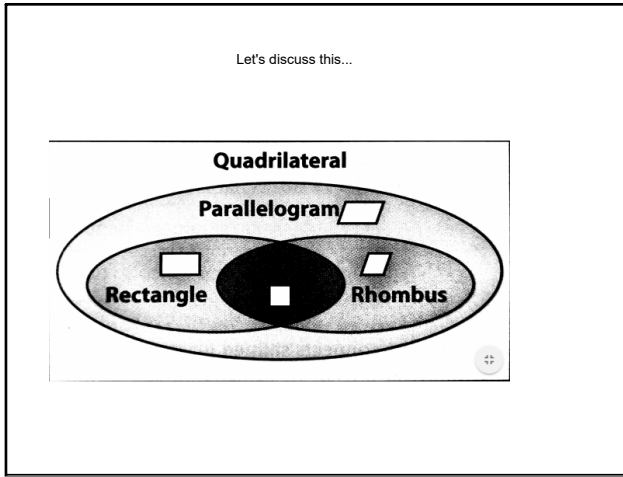
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### Quadrilaterals – Venn Diagram

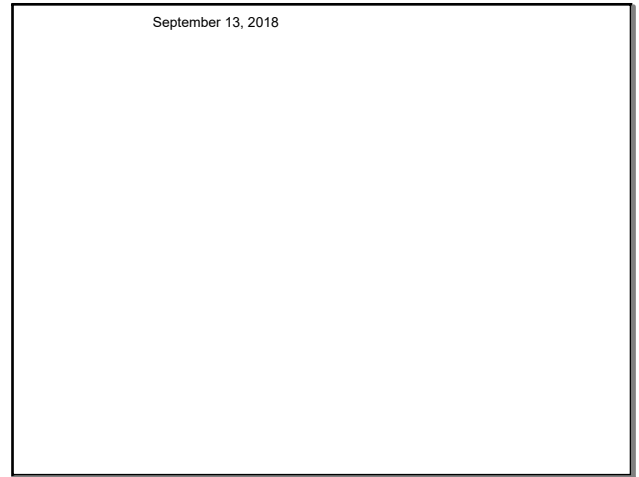
Complete the Venn diagram with the name of the appropriate quadrilateral. Include a diagram(s) to represent each quadrilateral.



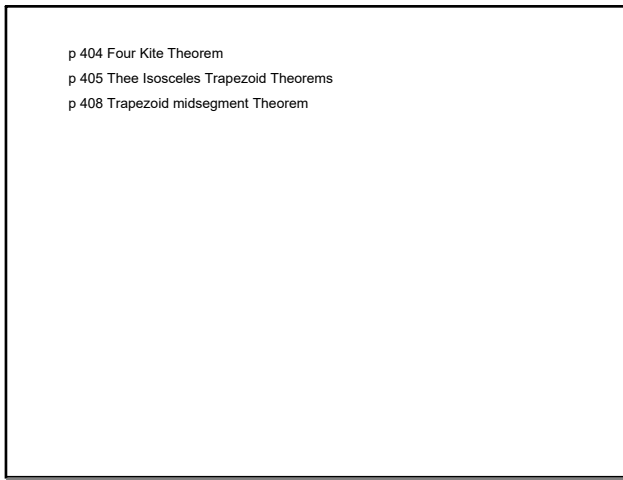
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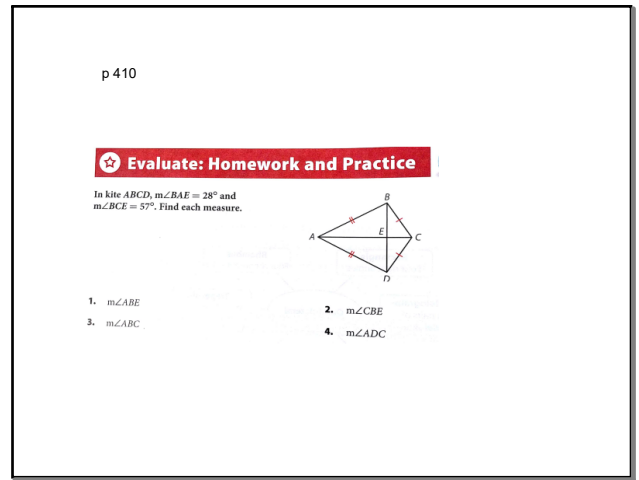
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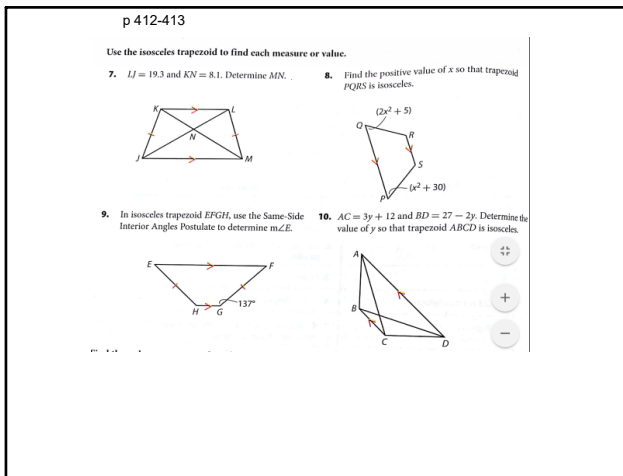
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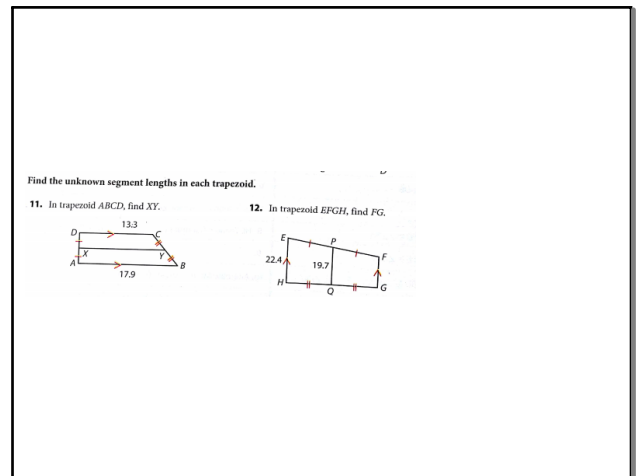
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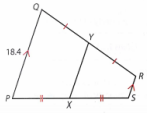


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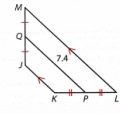


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13. In trapezoid PQRS,  $PQ = 4RS$ . Determine XY.

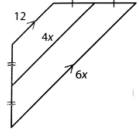


14. In trapezoid JKLM,  $PQ = 2JK$ . Determine LM.

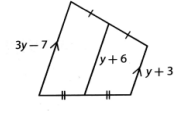


**Algebra** Find the length of the midsegment of each trapezoid.

18.



19.



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Study Guide

Sep 6-11:05 AM

Quiz

Sep 6-12:47 PM