

September 10, 2018

What are the scale factors for the following figures??

Image  
preimage  
How do you know?  
Scale factor

$(2,3) * 2 = (4,6)$

$(4,4) * \frac{1}{2} = (2,2)$

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  
parallel  
Midsegment!

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

Sep 6-9:59 AM

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Your Turn

6. Find JL, PM, and m∠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  $\triangle ABC$ .

Sep 6-10:03 AM

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.  $2(n+2) = 11.3$   
 $2n + 4 = 11.3$   
 $2n = 7.3$   
 $n = 3.65$

13.  $2(n+12) = 6n$   
 $2n + 24 = 6n$   
 $24 = 4n$   
 $6 = n$

14.  $2(n+9) = 4n + 9$   
 $2n + 18 = 4n + 9$   
 $18 - 9 = 4n - 2n$   
 $9 = 2n$   
 $4.5 = n$

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

Sep 6-10:05 AM

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

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)  $2(2x-9) = x+12$   
 $4x-18 = x+12$   
 $-x = -x$   
 $3x-18 = 12$   
 $+18 +18$   
 $3x = 30$   
 $\div 3 \div 3$   
 $x = 10$

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

11)  $2(2x-9) = x+3$   
 $4x-18 = x+3$   
 $-x = -x$   
 $3x-18 = 12$   
 $+18 +18$   
 $3x = 30$   
 $\div 3 \div 3$   
 $x = 10$

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

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

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

15) Find  $PR$   $2(2x+10) = 14+x$   
 $4x+20 = 14+x$   
 $-x = -x$   
 $3x+20 = 14$   
 $-20 -20$   
 $3x = -6$   
 $\div 3 \div 3$   
 $x = -2$   
 $PR = x+14$   
 $PR = -2+14$   
 $PR = 12$

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

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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:

1. Opposite sides are congruent ( $AB = DC$ ),  $AD = BC$ .
2. Opposite angles are congruent ( $D = B$ ),  $A = C$ .
3. Consecutive angles are supplementary ( $A + D = 180^\circ$ ),  $C + B = 180^\circ$ ,  $B + A = 180^\circ$ ,  $O + C = 180^\circ$ .
4. If one angle is right, then all angles are right.
5. The diagonals of a parallelogram bisect each other.
6. 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.  $m\angle PQR$   $\angle PQR + \angle QRS = 180^\circ$   
 $\angle PQR + 110 = 180$   
 $-110 -110$   
 $\angle PQR = 70$

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  $y = 9$   $AM = MB = ME = EA$

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

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

7.  $AM = MB = ME = EA$  **Yes**

8. **Yes**

9. **No**

10. **No**

11. **Yes**

12. **Yes**

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)  $x = 9$

6)  $x = 14$

7)  $x = 0$

8)  $x = 3$

9)  $x = 5$

TRY 3!

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11) Find  $m\angle D$

12) Find  $m\angle X$

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

14) Find  $m\angle D$ :  $13+15x = 11$   
 $15x = -2$   
 $x = -2/15$

15) Find  $RS$ :  $2(x+1) - 5 = 17$   
 $2x + 2 - 5 = 17$   
 $2x - 3 = 17$   
 $2x = 20$   
 $x = 10$

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

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14) Find  $m\angle D$ :  $\angle E = \angle C$   
 $1+9x = 13+15x$   
 $24x = 12$   
 $x = 0.5$

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

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?

Verify that the triangles are similar.

$\triangle PQR$  and  $\triangle STU$

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

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

**SAS**

left  $\frac{2.9}{5.8} = .5$   
right  $\frac{5.8}{11.6} = .5$   
 $70^\circ = 70^\circ$

**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  $\frac{x}{30} = \frac{100}{44}$   
leg  $\frac{30}{44} = \frac{100}{x}$   
 $x^2 = 144$   
 $x = 12$

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

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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AA, SAS, SSS

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

Transversals!

parallel

vertical angles

$\triangle STU \sim \triangle ADC$  similar, AA similarity,  $\triangle SDC$

SSS

$\frac{8}{12} = \frac{16}{24} = .5$   
 $\frac{9}{18} = .5$   
 $\frac{12}{24} = .5$

$\triangle KLM \sim \triangle JKL$  similar, SSS similarity,  $\triangle BCD$

$\triangle UTS$  not similar

SAS

$\frac{98}{14} = 7$   
 $\frac{70}{10} = 7$   
 $\frac{30}{9} = 3.3$   
 $\frac{42}{14} = 3$

Sep 13-7:52 AM

Unit 2 - Dilations & Similarity Study Guide

1) A dilation is a transformation that results in similar shapes. Therefore, the corresponding parts of both shapes share these properties except which one?  A) Congruent angles  B) Parallel sides  C) Co-linear points  D) Proportional sides  E) Congruent sides

2) Dilate the polygon by a scale factor of 1.5 about the origin and list the pre-image points as  $A(2,3)$  and the post-image points as  $A'(3,4.5)$

3) Dilate the triangle by a scale factor of  $\frac{1}{2}$  about the origin and list the pre-image points as  $J(2.5, 1.5)$  and the post-image points as  $J'(1.25, 0.75)$

In the figure at right, determine the following information:

Scale Factor: 3

$C(3,6)$   $C'(9,18)$

Triangle Similarity Proof

Write the triangle similarity statement and by theorem using AA, SAS, or SSS - SHOW YOUR WORK!

$\triangle ABC \sim \triangle DEF$  by AA

$\triangle ABC \sim \triangle DEF$  by SAS

$\frac{16}{24} = \frac{40}{60} = .66$   
 $\frac{18}{27} = .66$

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1) What is the scale factor (black triangle = pre-image, red triangle = image)

$K(0,1)$   $K'(0,5)$

Scale factor = 5

Find the missing length indicated.

2)  $\triangle ABD$

$2(2x-8) = 3x-6$   
 $4x-16 = 3x-6$   
 $-3x$     $-3x$   
 $x-16 = -6$   
 $+16$     $+16$   
 $x = 10$   
 $3x-6$   
 $3(10)-6$   
 $30-6 = 24$

3-4) State if the triangles in each pair are similar. If so, state how you know they are similar and complete the similarity statement.

$\triangle VCY \sim \triangle CBT$

Scale factor = 3

1) dilation of 3  
2) 24  
3) similar, AA similarity,  $\triangle ABC$   
4) not similar

$\frac{12}{19} = .63$   
 $\frac{18}{27} = .66$

Sep 13-3:19 PM

$\triangle ABC \cong \triangle XYZ$  by **SSS**  
 $\triangle APQ \cong \triangle SRU$  by **SAS**

**Triangle Proportionality & Adjugement Theorem**  
 109 Find  $x$ .  $x = 3$   
 111 If  $AB = 12$ ,  $CE = 32$  and  $DE = 14$ , find the perimeter of each triangle below.

Perimeter of  $\triangle ABC = 44$   
 Perimeter of  $\triangle ACD = 84$   
 $44 + 44 = 88$

**Application of Similarity - Solve each word problem to two decimal.**  
 123 In the diagram at right, a man looks down at a mirror from one level of a B. The man is 5.5 feet from the mirror's center which is 10.8 from a vertical line drawn from the top of the signal to the ground. How can we see the top of the signal, how high is it?

$\frac{x}{10.5} = \frac{6}{3.5}$   
 $3.5x = 63$   
 $x = 18$   
 $a^2 + b^2 = c^2$   
 $18^2 + 10.8^2 = c^2$   
 $434.25 = c^2$   
 $20.8 = c$

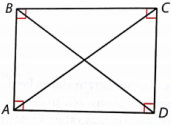
Sep 13-10:05 AM

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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  $BD - AC$ ?



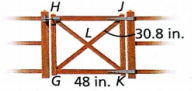
4. An artist connects stained glass pieces with lead strips. In this rectangular window, the strips are cut so that  $FH = 34$  in. Find  $JG$ . Explain.



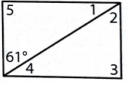
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The rectangular gate has diagonal braces. Find each length.

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



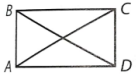
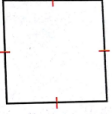
- Find the measure of each numbered angle in the rectangle.



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p 395 theorem  
 p 396 theorems  
 p399-400


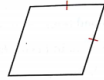
Determine whether each quadrilateral must be a rectangle. Explain.

- 
  
 Given:  $BD = AC$
- 

Sep 6-10:28 AM



p 400

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

- 
- 

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

- Conclusion:  $JKLM$  is a rhombus.
- Conclusion:  $PQRS$  is a square.

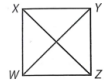
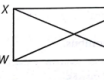
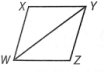
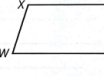



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p 401

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

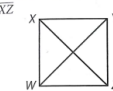
- Given:  $\overline{XY} \cong \overline{ZW}$ ,  $\overline{XY} \parallel \overline{ZW}$ ,  $\overline{WY} \cong \overline{XZ}$ ,  $\overline{WY} \perp \overline{XZ}$ .
- Given:  $\overline{XY} \cong \overline{ZW}$ ,  $\overline{XW} \cong \overline{YZ}$ ,  $\overline{WY} \cong \overline{XZ}$ .
- Given:  $\angle WXY \cong \angle YZW$ ,  $\angle XWZ \cong \angle ZYX$ ,  $\angle XWY \cong \angle YWZ$ ,  $\angle XYW \cong \angle ZYW$ .
- Given:  $m\angle WXY = 130^\circ$ ,  $m\angle XWZ = 50^\circ$ ,  $m\angle WZY = 130^\circ$ .

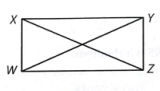
Sep 6-10:31 AM

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

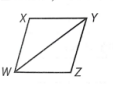
13. Given:  $\overline{XY} \cong \overline{ZW}$ ,  $\overline{XY} \parallel \overline{ZW}$ ,  $\overline{WY} \cong \overline{XZ}$ ,  $\overline{WY} \perp \overline{XZ}$



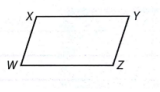
14. Given:  $\overline{XY} \cong \overline{ZW}$ ,  $\overline{XW} \cong \overline{ZY}$ ,  $\overline{WY} \cong \overline{XZ}$



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



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



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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.

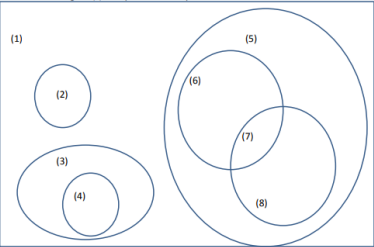
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    graph TD
      A[Quadrilateral ABCD] --> B[If 2 pair opposite sides are parallel, ABCD is a (1)]
      A --> C[If 1 pair opposite sides are parallel, ABCD is a (2)]
      A --> D[If no opposite sides are parallel, ABCD is a (3)]
      B --> E[If 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)]
    
```

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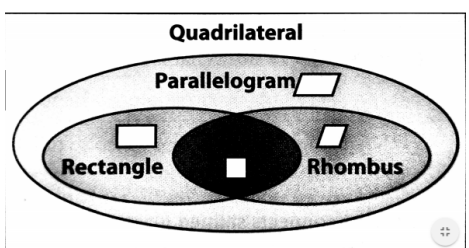
### Quadrilaterals – Venn Diagram

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



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Let's discuss this...



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p 404 Four Kite Theorem  
 p 405 Thee Isosceles Trapezoid Theorems  
 p 408 Trapezoid midsegment Theorem

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p 410

**Evaluate: Homework and Practice**

In kite  $ABCD$ ,  $m\angle BAE = 28^\circ$  and  $m\angle BCE = 57^\circ$ . Find each measure.



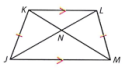
- $m\angle ABE$
- $m\angle CBE$
- $m\angle ABC$
- $m\angle ADC$

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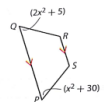
p 412-413

Use the isosceles trapezoid to find each measure or value.

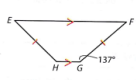
7.  $LJ = 19.3$  and  $KN = 8.1$ . Determine  $MN$ .



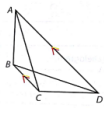
8. Find the positive value of  $x$  so that trapezoid  $PQRS$  is isosceles.



9. In isosceles trapezoid  $EFGH$ , use the Same-Side Interior Angles Postulate to determine  $m\angle E$ .




10.  $AC = 3y + 12$  and  $BD = 27 - 2y$ . Determine the value of  $y$  so that trapezoid  $ABCD$  is isosceles.



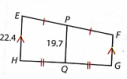
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Find the unknown segment lengths in each trapezoid.

11. In trapezoid  $ABCD$ , find  $XY$ .

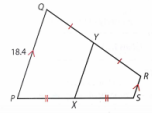


12. In trapezoid  $EFGH$ , find  $FG$ .

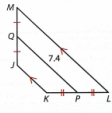


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13. In trapezoid  $PQRS$ ,  $PQ = 4RS$ . Determine  $XY$ .

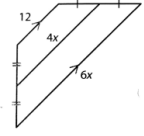


14. In trapezoid  $JKLM$ ,  $PQ = 2JK$ . Determine  $LM$ .

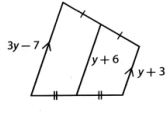


**Algebra** Find the length of the midsegment of each trapezoid.

18.



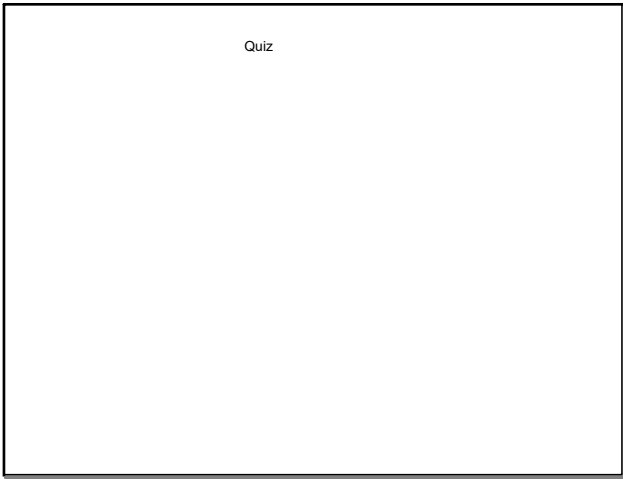
19.



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Study Guide

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Sep 6-12:47 PM