

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

## 4-1 Triangle and Triangle Theorems

### Standard

- B.G.GMD.A.2 Use several angle properties to find an unknown angle measure.

### Objectives

- SWBAT identify and use angle properties IOT classify triangles according to their sides and angles.
- SWBAT identify and use angle properties IOT solve equations to find the measures of unknown angles.

### Key Concepts

\_\_\_\_\_ - an enclosed two-dimensional figure having at least 3 sides and angles.

\_\_\_\_\_ - a three-sided polygon.

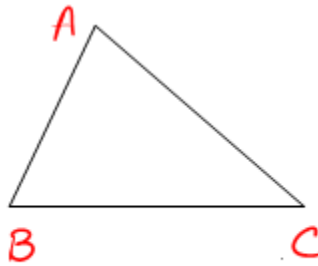
\_\_\_\_\_ - equal

\_\_\_\_\_ - a polygon with all sides congruent.

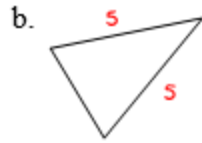
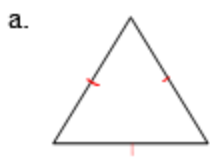
\_\_\_\_\_ - a polygon with all angles congruent.

### Examples

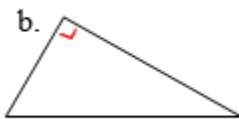
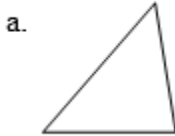
1. Identify the following
  - a. sides \_\_\_\_\_
  - b. vertices \_\_\_\_\_
  - c. interior angles \_\_\_\_\_



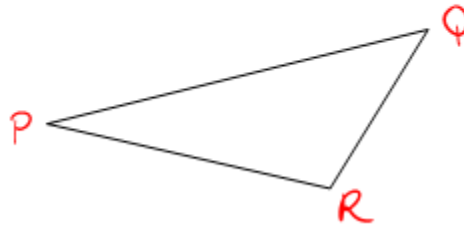
2. Classify the triangles according to its sides



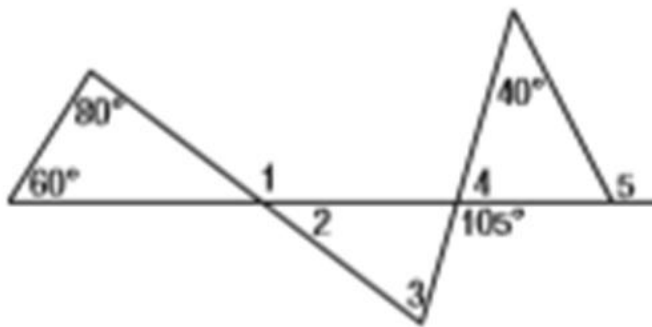
3. Classify the triangles according to its angles.



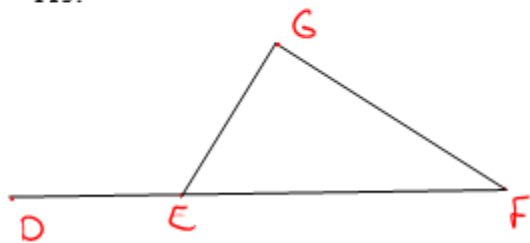
4. An artist is using the figure at the right to create a diagram for a publication. Using the triangle-sum theorem to find  $m\angle Q$  when  $m\angle P = 27$ ,  $m\angle R = 2x$  and  $m\angle Q = x + 9$ .



5. Find the measures of the missing angles.



6. Find the  $m\angle EFG$ , if  $m\angle G = 6x$ ,  $m\angle EFG = 3x - 2$  and  $m\angle GED = 115$ .



-----Lesson 4-1 Independent Practice/Lesson Check-----

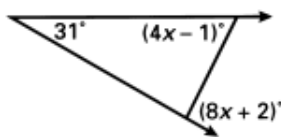
**EXERCISES**

Find the value of  $x$  in each figure.

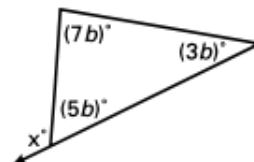
1.



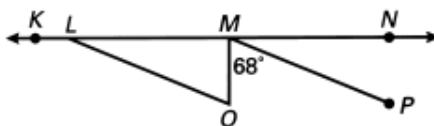
2.



3.



In the figure at the right,  
 $\overline{MO} \perp \overline{KN}$  and  $\overline{LO} \parallel \overline{MP}$ . Find  
 the measure of each angle.



4.  $\angle LMO$  \_\_\_\_\_      5.  $\angle OLM$  \_\_\_\_\_      6.  $\angle LOM$  \_\_\_\_\_      7.  $\angle KLO$  \_\_\_\_\_

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## 4-2 Congruent Triangles





### Standard

- B.G.GMD.A.2 Use several angle properties to find an unknown angle measure.

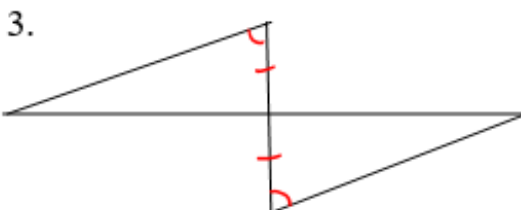
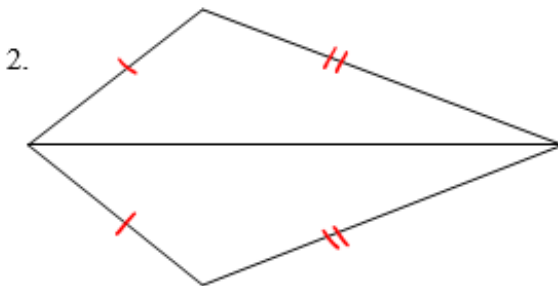
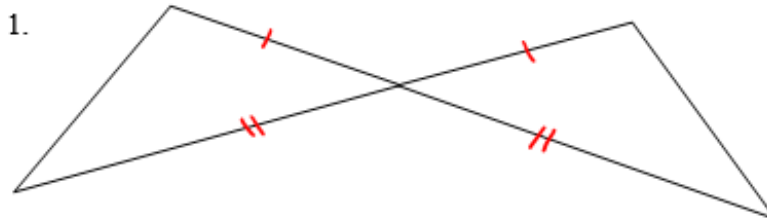
### Objectives

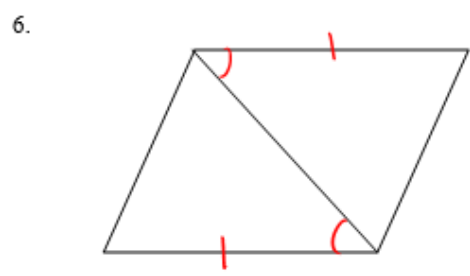
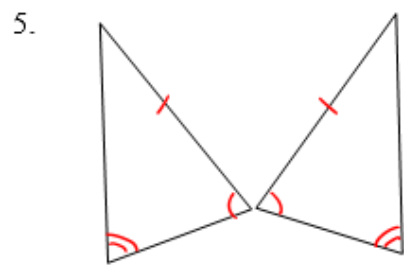
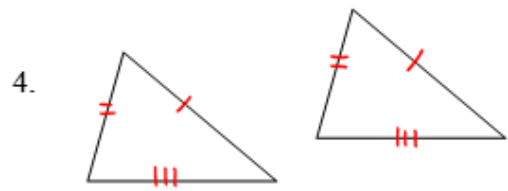
- SWBAT use definitions, properties and theorems IOT prove triangles are congruent.

### Key Concepts

Concept Summary		Proving Triangles Congruent	
SSS	SAS	ASA	AAS
			
Three pairs of corresponding sides are congruent.	Two pairs of corresponding sides and their included angles are congruent.	Two pairs of corresponding angles and their included sides are congruent.	Two pairs of corresponding angles and the corresponding nonincluded sides are congruent.

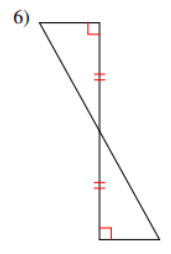
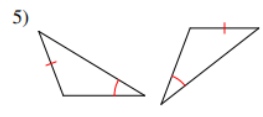
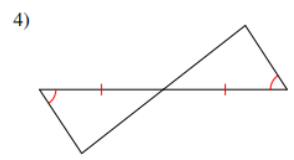
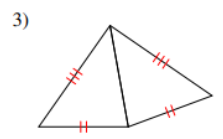
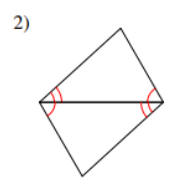
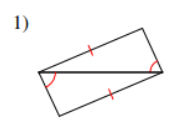
### Examples





-----Lesson 4-2 Independent Practice/Lesson Check-----

State if the two triangles are congruent. If they are, state how you know.



Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

## 4-7 Polygons & Angles

### Standard

- B.G.GMD.A.2 Use several angle properties to find an unknown angle measure.

### Objectives

- SWBAT use polygon angle formulas IOT determine the measures of interior and exterior angles in polygons.

### Key Concepts

\_\_\_\_\_ - a point that joins two consecutive sides in a polygon.

\_\_\_\_\_ - a polygon with all sides congruent.

\_\_\_\_\_ - a polygon having all angles less than 180.

\_\_\_\_\_ - a polygon having at least one angle greater than 180.

### Examples

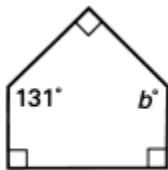
1. (I do) Use the polygon angle sum formula to find the **sum** of the angles in the following.
  - a. pentagon
  - b. quadrilateral
  - c. octagon

2. (I do) Find the measure of each **interior** angle in a regular hexagon.

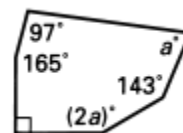
3. (I do) Find the measure of each **exterior** angle in a regular octagon.

4. (We do) Find the unknown angle measure or measures in each figure.

a.



b.



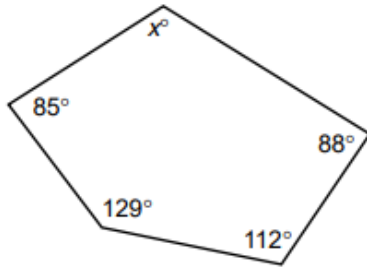
5. (They do) A playground has the shape of an irregular heptagon. A surveyor measures six of the angles on the playground. They have measures 139, 124, 144, 130, 118, and 125. Find the measure of the unknown angle.

-----Lesson 4-7 Independent Practice/Lesson Check-----

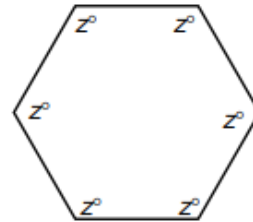
**EXERCISES**

Find the unknown angle measure in each figure.

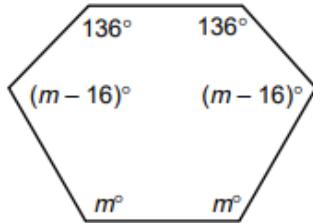
1.



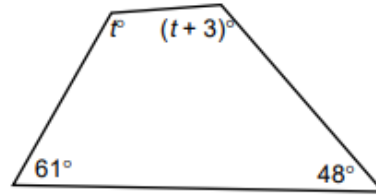
2.



3.



4.



5. Find the measure of each interior angle of a regular decagon. \_\_\_\_\_
6. Find the sum of the measures of the interior angles of a regular polygon with 20 sides. \_\_\_\_\_
7. Find the sum of the measures of the exterior angles of a regular heptagon. \_\_\_\_\_
8. Find the measure of each exterior angle of a regular polygon with 30 sides. \_\_\_\_\_

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

## 4-8 Parallelograms

### Standard

- B.G.GMD.A.2 Use several angle properties to find an unknown angle measure.

### Objectives

- SWBAT apply properties of parallelograms IOT determine missing side lengths and angle measures.

### Key Concepts

Properties of parallelograms:

If a quadrilateral is a parallelogram, opposite sides are congruent.

If a quadrilateral is a parallelogram, opposite angles are congruent.

If a quadrilateral is a parallelogram, its diagonals bisect each other.

Properties of other quadrilaterals:

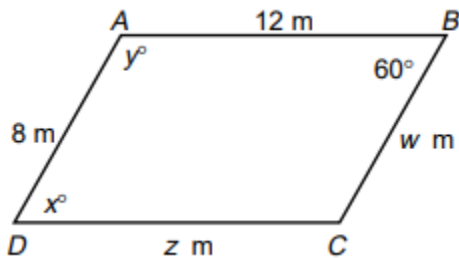
If a quadrilateral is a rectangle, its diagonals are congruent.

If a quadrilateral is a rhombus, then its diagonals are perpendicular and bisect each other.

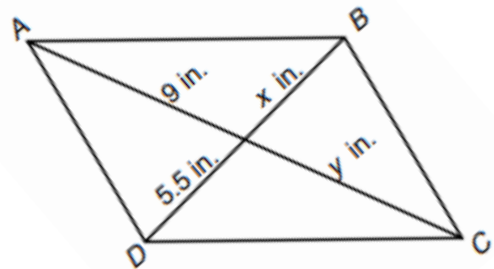
### Examples

1. (I do/We do) Find the unknown measures of sides and angles in the parallelograms.

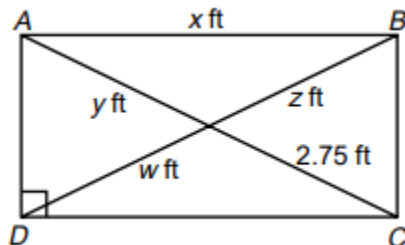
a.



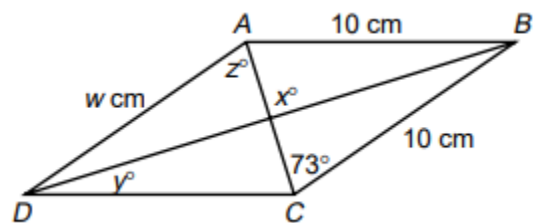
b.



c.



d.



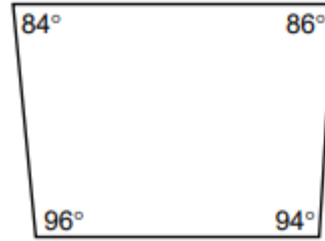


2. (We do) Do you think the given figure is a parallelogram? Explain your answer.

a.

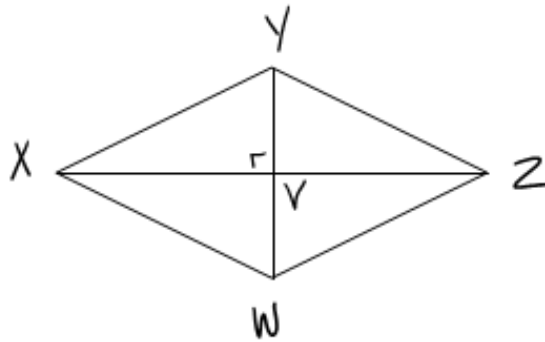


b.



3. (They do) A portion of a truss bridge forms quadrilateral  $XYZW$ , shown at the right. Given that  $XYZW$  is a rhombus and  $m\angle YXZ = 32^\circ$ , find the measure of each of the following.

- $\angle YXW$
- $\angle XYW$
- $\angle XVW$
- $\angle YZW$
- $\angle XWZ$

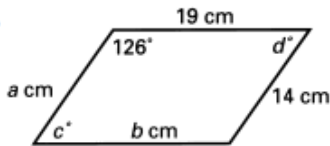


-----Lesson 4-8 Independent Practice/Lesson Check-----

**EXERCISES**

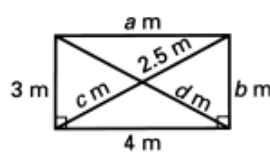
Find the values of  $a$ ,  $b$ ,  $c$ , and  $d$  in these parallelograms.

1.



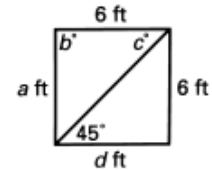
$a = \underline{\hspace{2cm}}$   $b = \underline{\hspace{2cm}}$   
 $c = \underline{\hspace{2cm}}$   $d = \underline{\hspace{2cm}}$

2.



$a = \underline{\hspace{2cm}}$   $b = \underline{\hspace{2cm}}$   
 $c = \underline{\hspace{2cm}}$   $d = \underline{\hspace{2cm}}$

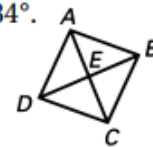
3.



$a = \underline{\hspace{2cm}}$   $b = \underline{\hspace{2cm}}$   
 $c = \underline{\hspace{2cm}}$   $d = \underline{\hspace{2cm}}$

Quadrilateral  $ABCD$ , shown at the right, is a rhombus with  $m\angle ABC = 84^\circ$ .

- $\angle DAB$  \_\_\_\_\_
- $\angle AED$  \_\_\_\_\_
- $\angle ADB$  \_\_\_\_\_
- $\angle DCE$  \_\_\_\_\_



Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

## 4-9 Trapezoids

### Standard

- B.G.GMD.A.2 Use several angle properties to find an unknown angle measure.

### Objectives

- SWBAT apply properties of trapezoids IOT determine missing side lengths and angle measures.

### Key Concepts

\_\_\_\_\_ - a quadrilateral with exactly one pair of parallel sides.

\_\_\_\_\_ - the parallel sides in a trapezoid.

\_\_\_\_\_ - the nonparallel in a trapezoid.

\_\_\_\_\_ - formed by a base and one of the legs.

\_\_\_\_\_ - a trapezoid with one pair of congruent base angles.

\_\_\_\_\_ - the segment that joins the midpoints of the nonparallel sides in a trapezoid.

### Examples

1. (I do) Label the parts following parts of the trapezoid.

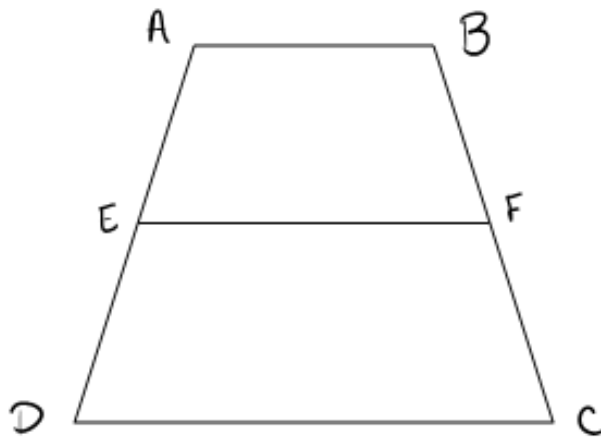
a. parallel sides

b. bases

c. legs

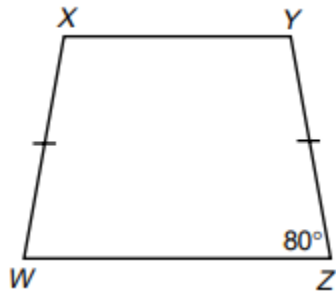
d. base angles

e. median

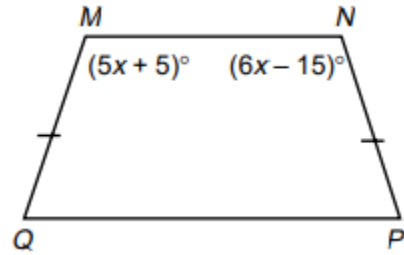


2. (We do) The given figure is a trapezoid. Find all the unknown angle measures.

a.

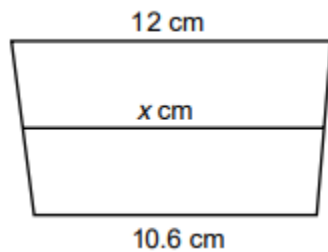


b.

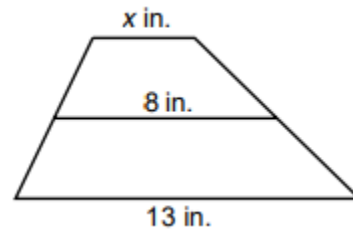


3. (We do) A trapezoid and its median are shown. Find the value of  $x$ .

a.



b.



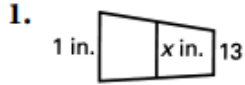
4. (They do) The plans for a stage design show trapezoid  $QRST$ , where  $A$  is the midpoint of  $RQ$  and  $B$  is the midpoint of  $ST$ .

a. Given:  $QT \parallel RS$ ,  $m\angle QRS = 53$ ,  $RS = 25\text{ cm}$  and  $QT = 16\text{ cm}$ . Draw a trapezoid that represents this situation.

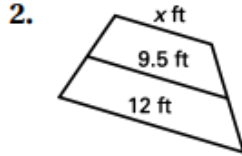
b. Find  $AB$  and  $m\angle RQT$ .

**EXERCISES**

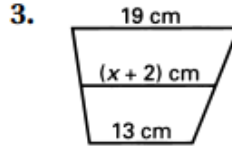
A trapezoid and its median are shown. Find the value of  $x$ .



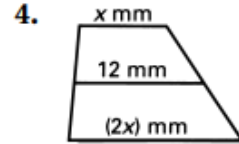
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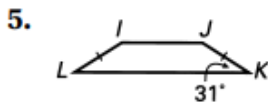


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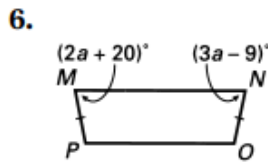


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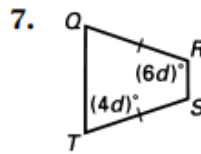
The given figure is a trapezoid. Find the measures of all the unknown angles.



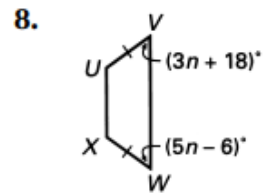
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