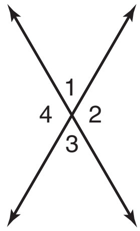
Name ______________________ Class ______________ Date ______________

Reteaching 7-1

Pairs of Angles



- *Vertical angles* are pairs of opposite angles formed by two intersecting lines. They are congruent.

  Example 1: ∠1 and ∠3, ∠4 and ∠2

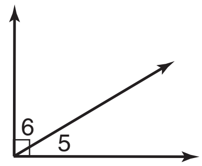
- *Adjacent angles* have a common vertex and a common side, but no common interior points.

  Example 2: ∠1 and ∠2, ∠1 and ∠4

- Two *supplementary angles* form a 180° angle.

  Example 3: ∠1 and ∠4 are supplementary angles.
  ∠3 is also a supplement of ∠4.

If you know the measure of one supplementary angle, you can find the measure of the other. → If $m\angle 4$ is 120°, then $m\angle 1$ is 180° − 120°, or 60°.

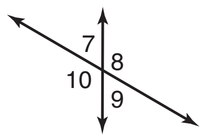


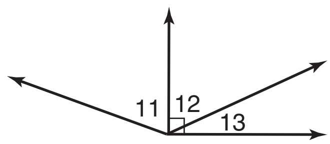
- Two *complementary angles* form a 90° angle.

  Example 4: ∠5 and ∠6 are complementary angles.
  ∠6 is a complement of ∠5.

If you know the measure of one complementary angle, you can find the measure of the other. → If $m\angle 5$ is 30°, then $m\angle 6$ is 90° − 30°, or 60°.

Use the diagrams at the right for Exercises 1–5.





1. Vertical angles: ∠7 and ∠9
2. Adjacent angles: ∠10 and ∠7 or ∠9
3. Supplementary angles: ∠8 and ∠7 or ∠9
4. Complementary angles: ∠12 and ∠13
5. Vertical angles: ∠8 and ∠10

Find the measure of the supplement of each angle.

6. 38° — 142°
7. 65° — 115°
8. 120° — 60°

Find the measure of the complement of each angle.

9. 25° — 65°
10. 18° — 72°
11. 40° — 50°

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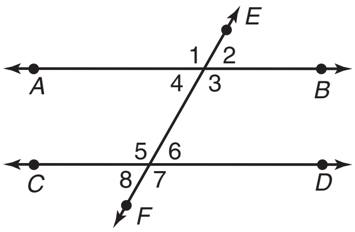
Reteaching 7-2

Angles and Parallel Lines

Look at the figure at the right.

- Line $\overleftrightarrow{AB}$ is parallel to line $\overleftrightarrow{CD}$ ($\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$)
- Line $\overleftrightarrow{EF}$ is a *transversal.*



Alternate interior angles lie within a pair of lines and on opposite sides of the transversal.

Example 1: $\angle 3$ and $\angle 5$, $\angle 4$ and $\angle 6$

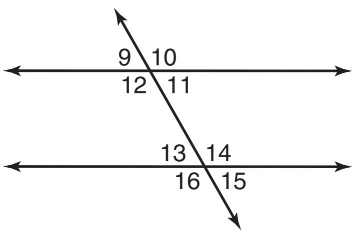
Alternate interior angles are congruent. If $m\angle 4$ is 60°, then $m\angle 6$ is also 60°.

Corresponding angles lie on the same side of the transversal and in corresponding positions.

Example 2: $\angle 1$ and $\angle 5$, $\angle 3$ and $\angle 7$

Corresponding angles are congruent. If $m\angle 1$ is 120°, then $m\angle 5$ is also 120°.

Use the diagram at the right to complete Exercises 1–2.



1. Name the alternate interior angles.

a. $\angle 11$ and $\angle$ __?__ 13

b. $\angle 12$ and $\angle$ __?__ 14

2. Name the corresponding angles.

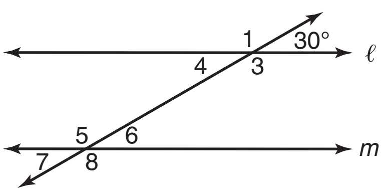
a. $\angle 16$ and $\angle$ __?__ 12

b. $\angle 14$ and $\angle$ __?__ 10

c. $\angle 9$ and $\angle$ __?__ 13

d. $\angle 11$ and $\angle$ __?__ 15

In the diagram at the right, $\ell \parallel m$. Find the measure of each angle.



3. $\angle 1$ 150°

4. $\angle 3$ 150°

5. $\angle 6$ 30°

6. $\angle 5$ 150°

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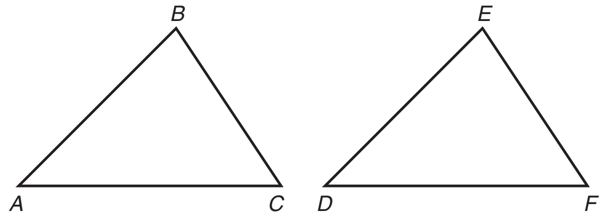
Reteaching 7-3

Congruent Figures

Congruence statements reveal corresponding parts. $\triangle ABC \cong \triangle DEF$



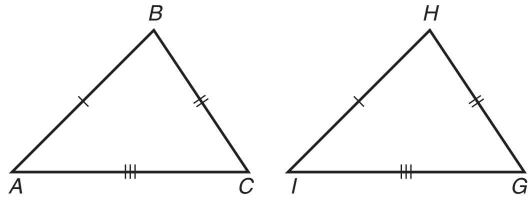
Example 1: $\overline{AB}$ corresponds to $\overline{DE}$.
$\angle C$ corresponds to $\angle F$.

Corresponding parts are congruent ($\cong$).

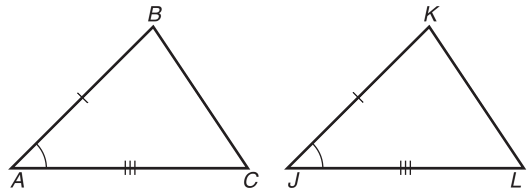
Example 2: $\overline{AB} \cong \overline{DE}$
$\angle C \cong \angle F$

Triangles are congruent if you can show just three parts are congruent.

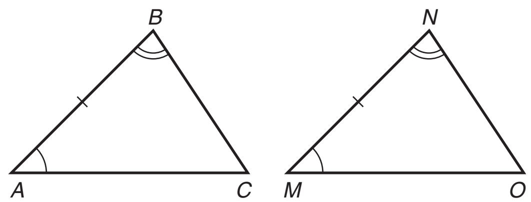
side-side-side (SSS)
(The marks show which parts are congruent.)



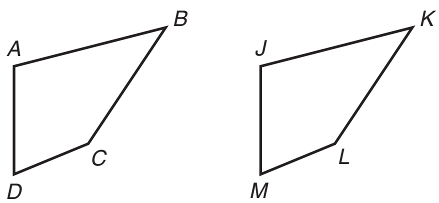
side-angle-side (SAS)
(The arcs show which angels are congruent.)



angle-side-angle (ASA)



In the diagram at the right, *ABCD* ≅ *JKLM*. Complete the following.



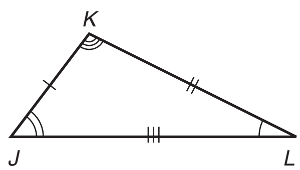
1. $\angle A \cong$ ___$\angle J$___

2. $\overline{KL} \cong$ ___$\overline{BC}$___

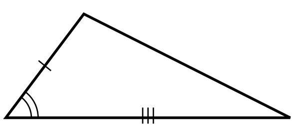
3. $\angle M \cong$ ___$\angle D$___

4. $\overline{DC} \cong$ ___$\overline{ML}$___

Is the triangle congruent to △ *JKL*? If so, tell why. Use SSS, SAS, or ASA.

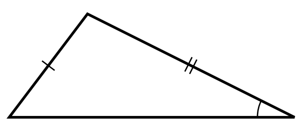


5.



yes; SAS.

6.



yes; SAS

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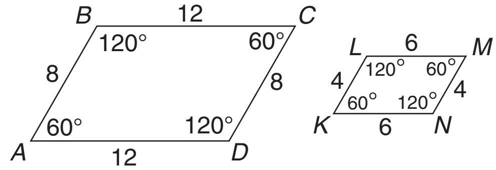
Reteaching 7-4

Similar Figures

Similar polygons have congruent corresponding angles and corresponding sides that are in proportion. The symbol ~ means *is similar to*.



Example: Is parallelogram $ABCD \sim$ parallelogram $KLMN$?

① Check corresponding angles. $\angle A \cong \angle K$, $\angle B \cong \angle L$, $\angle C \cong \angle M$, and $\angle D \cong \angle N$

② Compare corresponding sides. $\frac{AB}{KL} = \frac{8}{4} = \frac{2}{1}$ $\frac{BC}{LM} = \frac{12}{6} = \frac{2}{1}$ $\frac{CD}{MN} = \frac{8}{4} = \frac{2}{1}$ $\frac{DA}{NK} = \frac{12}{6} = \frac{2}{1}$

Corresponding angles are congruent. Corresponding sides are in proportion. The parallelograms are similar.

You can use proportions to find unknown lengths in similar figures.

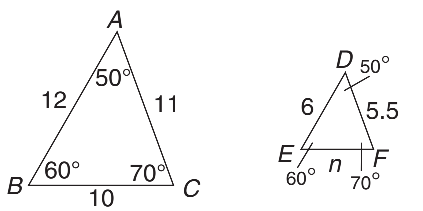
① To find EF, use a proportion. $\frac{AB}{DE} = \frac{BC}{EF}$ $\triangle ABC \sim \triangle DEF$

② Substitute. $\frac{12}{6} = \frac{10}{n}$

③ Use cross products. $12n = 60$

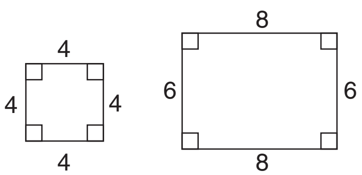
④ Solve. $n = 5$

$EF = 5$



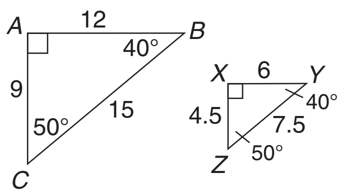
Tell whether each pair of polygons is similar. Explain why or why not.

1.



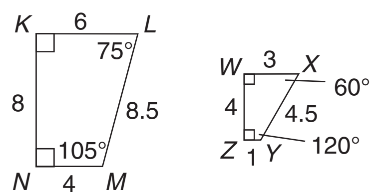
no; $\frac{4}{8} \neq \frac{6}{8}$

2.



yes; $\frac{9}{4.5} = \frac{12}{6}$

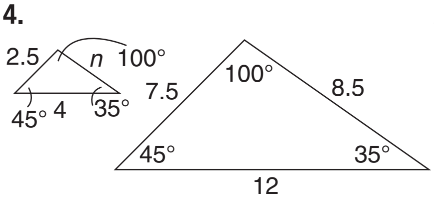
3.



no; corresponding angles are not congruent

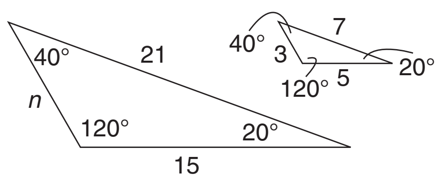
Exercises 4–6 show pairs of similar polygons. Find the unknown length.

4.



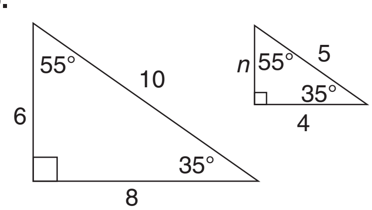
$n = 2.83$

5.



$n = 9$

6.



$n = 3$

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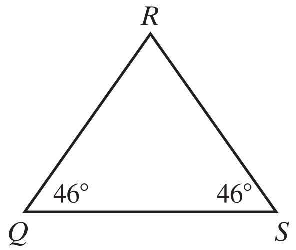
Reteaching 7-5

Proving Triangles Similar

The angles of a triangle add to 180°.

You can use the angle sum to find a missing angle measure.



$m\angle Q + m\angle R + m\angle S = 180°$ ← Angle sum.

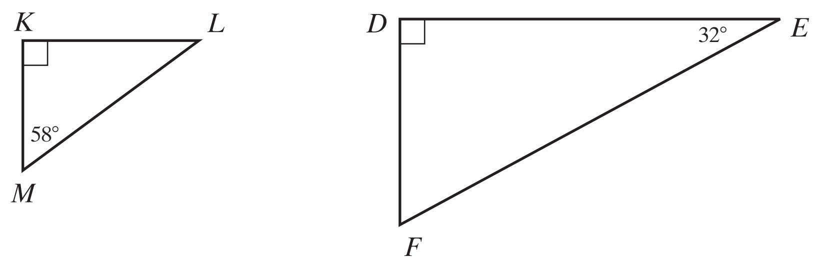
$46° + m\angle R + 46° = 180°$ ← Substitute.

$92° + m\angle R = 180°$ ← Simplify.

$92° - 92° + m\angle R = 180° - 92°$ ← Subtract.

$m\angle R = 88°$ ← Simplify.

You can also use angle measures to show that two triangles are similar.



Step 1: Use the angle sum to find $m\angle L$.

$90° + 58° + m\angle L = 180°$

$148° + m\angle L = 180°$

$148° - 148° + m\angle L = 180° - 148°$

$m\angle L = 32°$

Step 2: Use AA similarity.

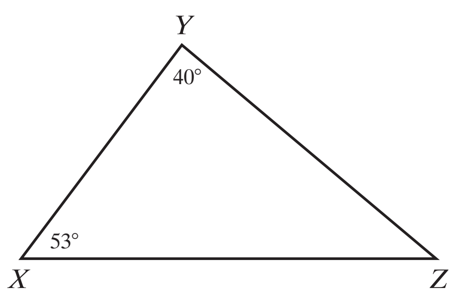
$m\angle K \cong m\angle D$

$m\angle L \cong m\angle E$

$\Delta KLM \sim \Delta DEF$

Determine the unknown angle measure in each triangle.

1.

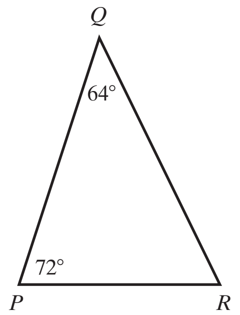


87°
____

Reteaching 7-5 (continued)

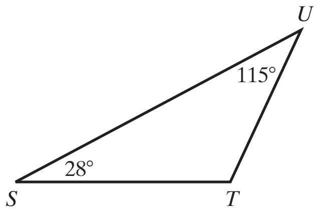
Proving Triangles Similar

2.



44°

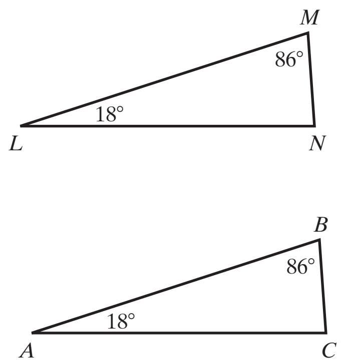
3.



37°

Show that the pair of triangles is similar.

4.



$86° + 18° + m\angle C = 180°$ — $m\angle B \cong m\angle M$

$104° + m\angle C = 180°$ — $m\angle C \cong m\angle N$

$104° - 104° + m\angle C = 180 - 104°$ — $\Delta ABC \sim \Delta LMN$

$m\angle C = 76°$

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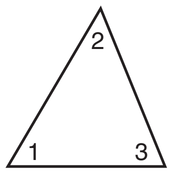
Reteaching 7-6

Angles and Polygons

For a polygon with n sides, the **sum of the measures of the interior angles** is $(n - 2)180°$.

Example 1: A triangle is a *3*-sided polygon. The sum of the angle measures is:

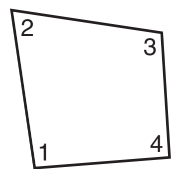
$$(3 - 2) \times 180° = 1 \times 180° = 180°$$



$m\angle 1 + m\angle 2 + m\angle 3 = 180°$

Example 2: A quadrilateral is a *4*-sided polygon. The sum of the angle measures is:

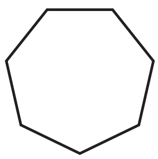
$$(4 - 2) \times 180° = 2 \times 180° = 360°$$



$m\angle 1 + m\angle 2 + m\angle 3 + m\angle 4 = 360°$

Example 3: A hepatagon has 7 sides.

$$(n - 2)180°$$
$$(7 - 2)180°$$
$$5 \times 180° = 900°$$



heptagon

The sum of the measures of the interior angles of a heptagon is 900°.

You can divide by the number of interior angles to find the measure of each angle.

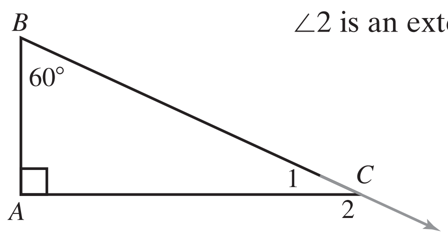
$$900° \div 7 = 128.6°$$

Each angle in a regular heptagon has a measure of 128.6°.

An **exterior angle** of a polygon is an angle formed by a side and an extension of an adjacent side.

The measure of an exterior angle of a triangle is equal to the sum of the measures of the interior angles at the other two vertices.

$\angle 2$ is an exterior angle



$m\angle 2 = m\angle A + m\angle B$ ← Exterior angle of triangle

$= 60° + 90°$ ← Substitute

$= 150°$ ← Simplify

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Reteaching 7-6 (continued)

Angles and Polygons

Find the sum of the measures of the interior angles of each polygon.

1. pentagon 540°
2. hexagon 720°
3. octagon 1,080°
4. nonagon 1,260°

Find the measure of each exterior angle of the triangle below.

5. ∠1 132°
6. ∠2 110°
7. ∠3 118°