Name______________________________ Date__________

Chapter 6 Maintaining Mathematical Proficiency

Write an equation of the line passing through point *P* that is perpendicular to the given line.

1. $P(5, 2),\ y = 2x + 6$

2. $P(4, 2),\ y = 6x - 3$

3. $P(-1, -2),\ y = -3x + 6$

4. $P(-8, 3),\ y = 3x - 1$

5. $P(6, 7),\ y = x - 5$

6. $P(3, 7),\ y = \frac{1}{4}x + 4$

Write the sentence as an inequality.

7. A number g is at least 4 and no more than 12.

8. A number r is more than 2 and less than 7.

9. A number q is less than or equal to 6 or greater than 1.

10. A number p is fewer than 17 or no less than 5.

11. A number k is greater than or equal to –4 and less than 1.

Name ____ Date __________

6.1 Perpendicular and Angle Bisectors

For use with Exploration 6.1

Essential Question What conjectures can you make about a point on the perpendicular bisector of a segment and a point on the bisector of an angle?

1 EXPLORATION: Points on a Perpendicular Bisector

Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

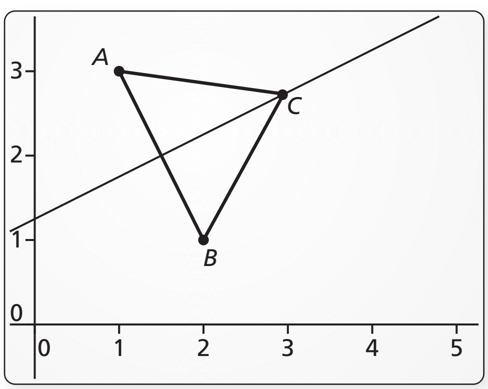
Work with a partner. Use dynamic geometry software.

a. Draw any segment and label it $\overline{AB}$. Construct the perpendicular bisector of $\overline{AB}$.

b. Label a point C that is on the perpendicular bisector of $\overline{AB}$ but is not on $\overline{AB}$.

c. Draw $\overline{CA}$ and $\overline{CB}$ and find their lengths. Then move point C to other locations on the perpendicular bisector and note the lengths of $\overline{CA}$ and $\overline{CB}$.

d. Repeat parts (a)–(c) with other segments. Describe any relationship(s) you notice.



Sample
Points
$A(1, 3)$
$B(2, 1)$
$C(2.95, 2.73)$
Segments
$AB = 2.24$
$CA = ?$
$CB = ?$
Line
$-x + 2y = 2.5$

2 EXPLORATION: Points on an Angle Bisector

Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

Work with a partner. Use dynamic geometry software.

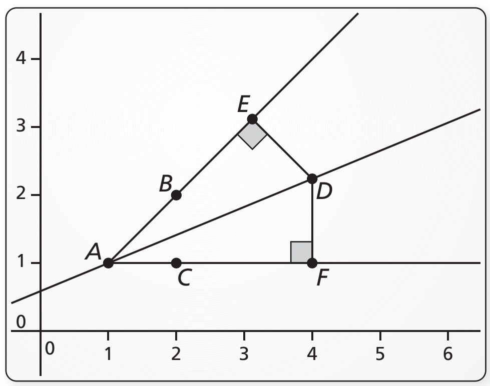
a. Draw two rays $\overrightarrow{AB}$ and $\overrightarrow{AC}$ to form $\angle BAC$. Construct the bisector of $\angle BAC$.

b. Label a point D on the bisector of $\angle BAC$.

2 EXPLORATION: Points on an Angle Bisector (continued)

c. Construct and find the lengths of the perpendicular segments from D to the sides of $\angle BAC$. Move point D along the angle bisector and note how the lengths change.

d. Repeat parts (a)–(c) with other angles. Describe any relationship(s) you notice.



Sample
Points
$A(1, 1)$
$B(2, 2)$
$C(2, 1)$
$D(4, 2.24)$
Rays
$AB = -x + y = 0$
$AC = y = 1$
Line
$-0.38x + 0.92y = 0.54$

Communicate Your Answer

3. What conjectures can you make about a point on the perpendicular bisector of a segment and a point on the bisector of an angle?

4. In Exploration 2, what is the distance from point D to $\overrightarrow{AB}$ when the distance from D to $\overrightarrow{AC}$ is 5 units? Justify your answer.

Name ____ Date __________

6.1 Notetaking with Vocabulary

For use after Lesson 6.1

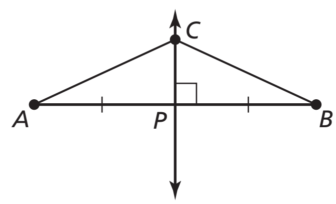
In your own words, write the meaning of each vocabulary term.

equidistant

Theorems

Theorem 6.1 Perpendicular Bisector Theorem

In a plane, if a point lies on the perpendicular bisector of a segment, then it is equidistant from the endpoints of the segment.



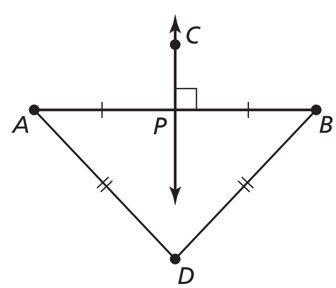
If $\overleftrightarrow{CP}$ is the $\perp$ bisector of $\overline{AB}$, then $CA = CB$.

Notes:

Theorem 6.2 Converse of the Perpendicular Bisector Theorem

In a plane, if a point is equidistant from the endpoints of a segment, then it lies on the perpendicular bisector of the segment.

If $DA = DB$, then point D lies on the $\perp$ bisector of $\overline{AB}$.

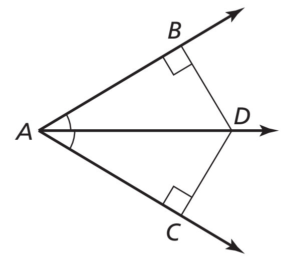


Notes:

6.1 Notetaking with Vocabulary (continued)

Theorem 6.3 Angle Bisector Theorem

If a point lies on the bisector of an angle, then it is equidistant from the two sides of the angle.

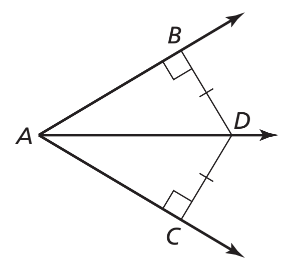


If $\overrightarrow{AD}$ bisects $\angle BAC$ and $\overline{DB} \perp \overrightarrow{AB}$ and $\overline{DC} \perp \overrightarrow{AC}$, then $DB = DC$.

Notes:

Theorem 6.4 Converse of the Angle Bisector Theorem

If a point is in the interior of an angle and is equidistant from the two sides of the angle, then it lies on the bisector of the angle.



If $\overline{DB} \perp \overrightarrow{AB}$ and $\overline{DC} \perp \overrightarrow{AC}$ and $DB = DC$, then $\overrightarrow{AD}$ bisects $\angle BAC$.

Notes:

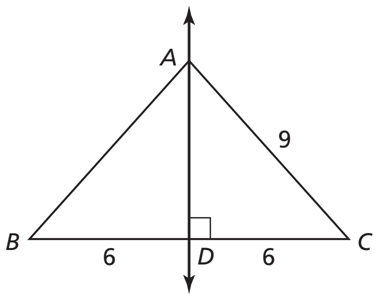
Name ______________________________________ Date __________

6.1 Notetaking with Vocabulary (continued)

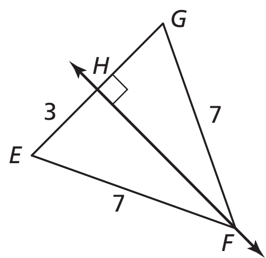
Extra Practice

In Exercises 1–3, find the indicated measure. Explain your reasoning.

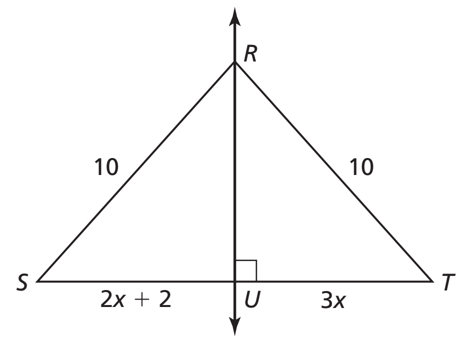
1. AB



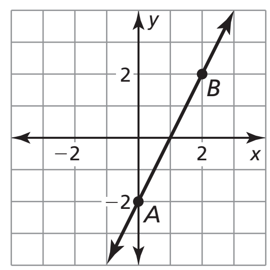
2. EG



3. SU

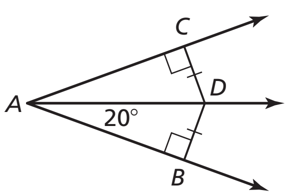


4. Find the equation of the perpendicular bisector of AB.

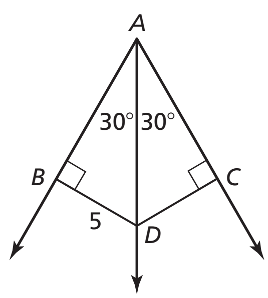


In Exercises 5–7, find the indicated measure. Explain your reasoning.

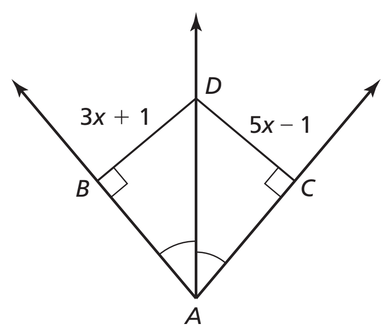
5. $m\angle CAB$



6. DC



7. BD



Name____ Date__________

6.2 Bisectors of Triangles

For use with Exploration 6.2

Essential Question What conjectures can you make about the perpendicular bisectors and the angle bisectors of a triangle?

1 EXPLORATION: Properties of the Perpendicular Bisectors of a Triangle

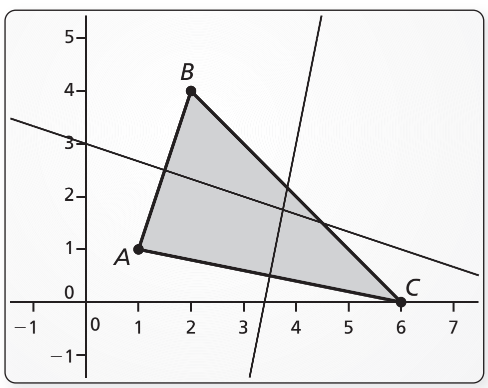
Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

Work with a partner. Use dynamic geometry software. Draw any $\triangle ABC$.

a. Construct the perpendicular bisectors of all three sides of $\triangle ABC$. Then drag the vertices to change $\triangle ABC$. What do you notice about the perpendicular bisectors?

b. Label a point D at the intersection of the perpendicular bisectors.

c. Draw the circle with center D through vertex A of $\triangle ABC$. Then drag the vertices to change $\triangle ABC$. What do you notice?



Sample

Points

$A(1, 1)$

$B(2, 4)$

$C(6, 0)$

Segments

$BC = 5.66$

$AC = 5.10$

$AB = 3.16$

Lines

$x + 3y = 9$

$-5x + y = -17$

2 EXPLORATION: Properties of the Angle Bisectors of a Triangle

Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

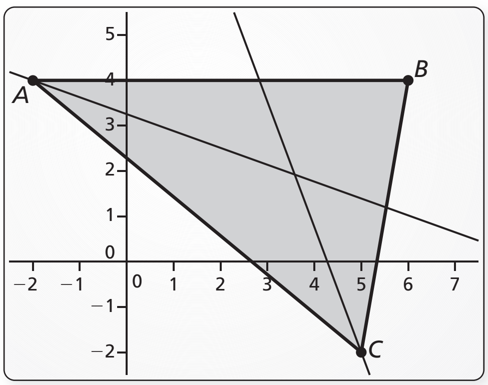
Work with a partner. Use dynamic geometry software. Draw any $\triangle ABC$.

a. Construct the angle bisectors of all three angles of $\triangle ABC$. Then drag the vertices to change $\triangle ABC$. What do you notice about the angle bisectors?

2 EXPLORATION: Properties of the Angle Bisectors of a Triangle (continued)

b. Label a point D at the intersection of the angle bisectors.

c. Find the distance between D and $\overline{AB}$. Draw the circle with center D and this distance as a radius. Then drag the vertices to change $\triangle ABC$. What do you notice?



Sample
Points
$A(-2, 4)$
$B(6, 4)$
$C(5, -2)$
Segments
$BC = 6.08$
$AC = 9.22$
$AB = 8$
Lines
$0.35x + 0.94y = 3.06$
$-0.94x - 0.34y = -4.02$

Communicate Your Answer

3. What conjectures can you make about the perpendicular bisectors and the angle bisectors of a triangle?

Name____ Date__________

6.2 Notetaking with Vocabulary
For use after Lesson 6.2

In your own words, write the meaning of each vocabulary term.

concurrent

point of concurrency

circumcenter

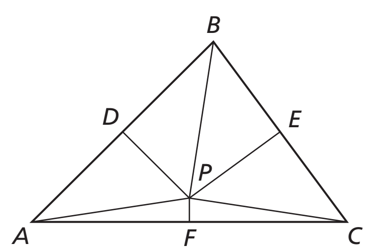
incenter

Theorems

Theorem 6.5 Circumcenter Theorem

The circumcenter of a triangle is equidistant from the vertices of the triangle.

If $\overline{PD}$, $\overline{PE}$, and $\overline{PF}$ are perpendicular bisectors, then $PA = PB = PC$.



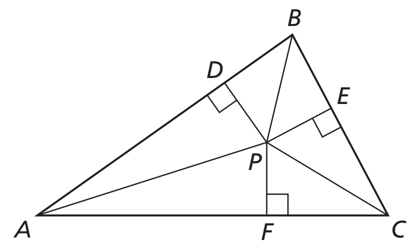
Notes:

Name ____ Date __________

Theorem 6.6 Incenter Theorem

The incenter of a triangle is equidistant from the sides of the triangle.

If $\overline{AP}$, $\overline{BP}$, and $\overline{CP}$ are angle bisectors of $\triangle ABC$, then $PD = PE = PF$.

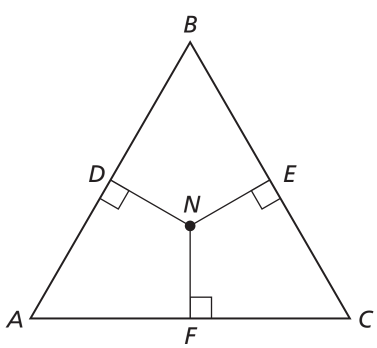


Notes:

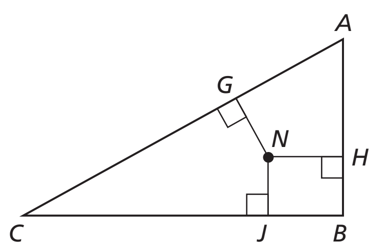
Extra Practice

In Exercises 1–3, *N* is the incenter of $\triangle ABC$. Use the given information to find the indicated measure.

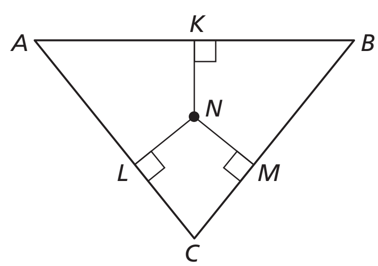
1. $ND = 2x - 5$
$NE = -2x + 7$
Find NF.



2. $NG = x - 1$
$NH = 2x - 6$
Find NJ.



3. $NK = x + 10$
$NL = -2x + 1$
Find NM.

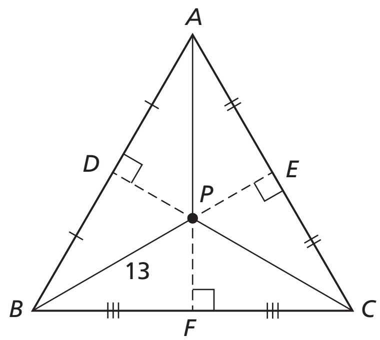


Name____ Date__________

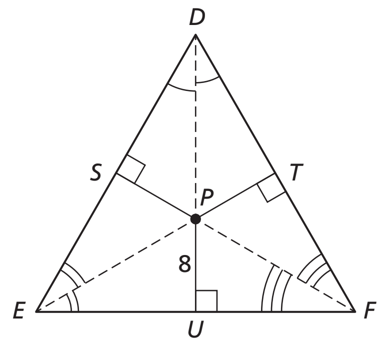
6.2 Notetaking with Vocabulary (continued)

In Exercises 4–7, find the indicated measure.

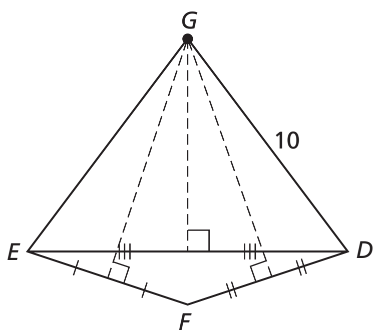
4. PA



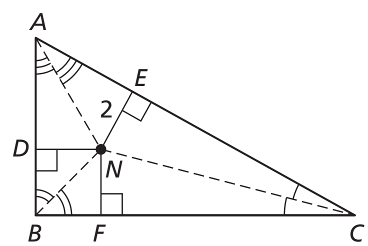
5. PS



6. GE

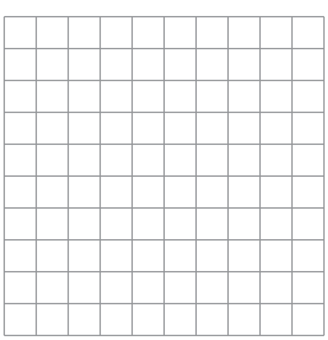


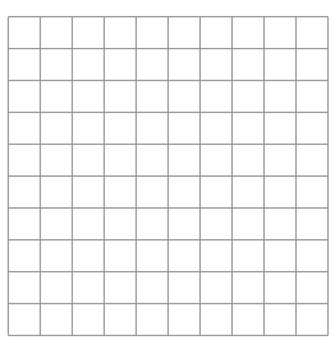
7. NF

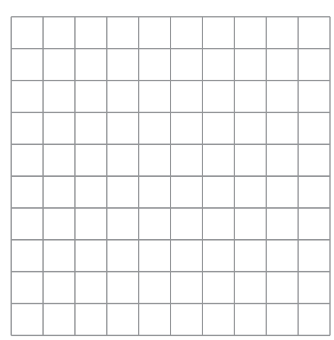


In Exercises 8–10, find the coordinates of the circumcenter of the triangle with the given vertices.

8. $A(-2,-2), B(-2,4), C(6,4)$ **9.** $D(3,5), E(3,1), F(9,5)$ **10.** $J(4,-7), K(4,-3), L(-6,-3)$







Name ____ Date __________

6.3 Medians and Altitudes of Triangles

For use with Exploration 6.3

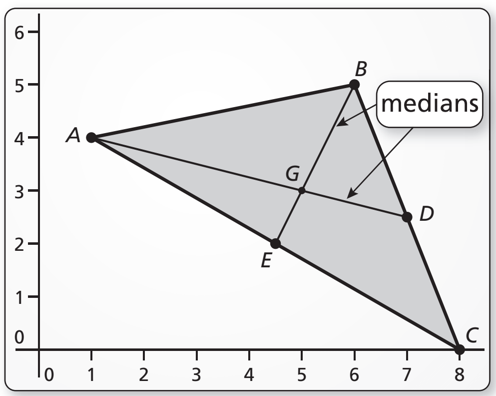
Essential Question What conjectures can you make about the medians and altitudes of a triangle?

1 EXPLORATION: Finding Properties of the Medians of a Triangle

Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

Work with a partner. Use dynamic geometry software. Draw any $\triangle ABC$.

a. Plot the midpoint of $\overline{BC}$ and label it D. Draw $\overline{AD}$, which is a *median* of $\triangle ABC$. Construct the medians to the other two sides of $\triangle ABC$.



Sample
Points
$A(1, 4)$
$B(6, 5)$
$C(8, 0)$
$D(7, 2.5)$
$E(4.5, 2)$
$G(5, 3)$

b. What do you notice about the medians? Drag the vertices to change $\triangle ABC$. Use your observations to write a conjecture about the medians of a triangle.

c. In the figure above, point G divides each median into a shorter segment and a longer segment. Find the ratio of the length of each longer segment to the length of the whole median. Is this ratio always the same? Justify your answer.

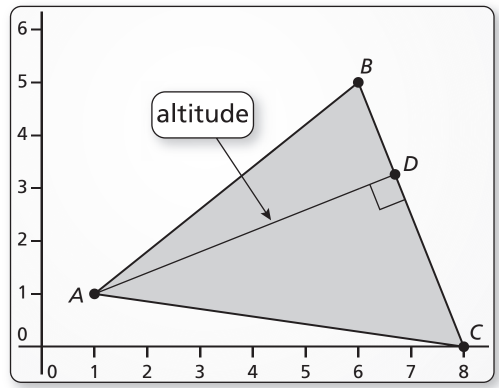
Name____ Date__________

2 EXPLORATION: Finding Properties of the Altitudes of a Triangle

Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

Work with a partner. Use dynamic geometry software. Draw any $\triangle ABC$.

a. Construct the perpendicular segment from vertex A to $\overline{BC}$. Label the endpoint D. $\overline{AD}$ is an *altitude* of $\triangle ABC$.



b. Construct the altitudes to the other two sides of $\triangle ABC$. What do you notice?

c. Write a conjecture about the altitudes of a triangle. Test your conjecture by dragging the vertices to change $\triangle ABC$.

Communicate Your Answer

3. What conjectures can you make about the medians and altitudes of a triangle?

4. The length of median $\overline{RU}$ in $\triangle RST$ is 3 inches. The point of concurrency of the three medians of $\triangle RST$ divides $\overline{RU}$ into two segments. What are the lengths of these two segments?

Name ____ Date __________

6.3 Notetaking with Vocabulary
For use after Lesson 6.3

In your own words, write the meaning of each vocabulary term.

median of a triangle

centroid

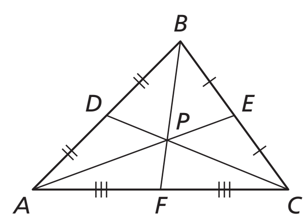
altitude of a triangle

orthocenter

Theorems

Theorem 6.7 Centroid Theorem

The centroid of a triangle is two-thirds of the distance from each vertex to the midpoint of the opposite side.



The medians of $\triangle ABC$ meet at point P, and

$AP = \frac{2}{3}AE$, $BP = \frac{2}{3}BF$, and $CP = \frac{2}{3}CD$.

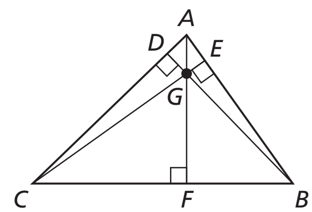
Notes:

Core Concepts

Orthocenter

The lines containing the altitudes of a triangle are concurrent. This point of concurrency is the **orthocenter** of the triangle.

The lines containing $\overline{AF}$, $\overline{BD}$, and $\overline{CE}$ meet at the orthocenter G of $\triangle ABC$.

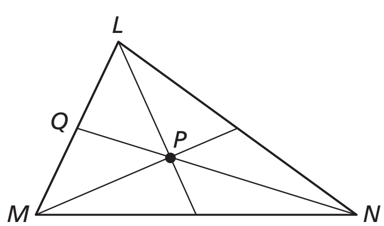


Notes:

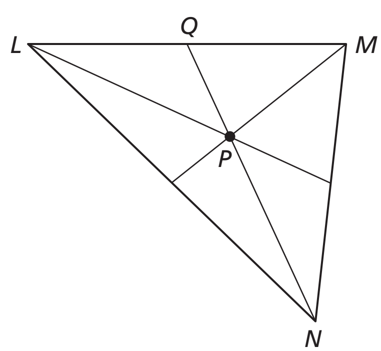
Extra Practice

In Exercises 1–3, point *P* is the centroid of $\triangle LMN$. Find *PN* and *QP*.

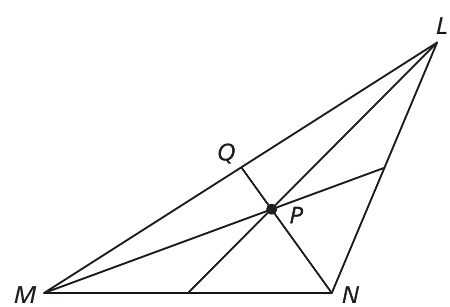
1. $QN = 33$



2. $QN = 45$



3. $QN = 39$

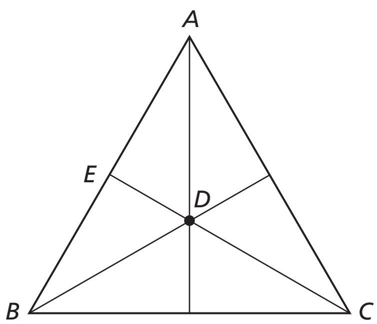


Name ______________________________ Date __________

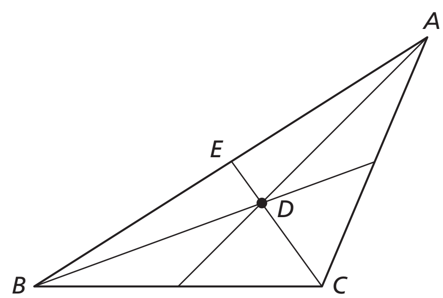
6.3 Notetaking with Vocabulary (continued)

In Exercises 4 and 5, point *D* is the centroid of $\triangle ABC$. Find *CD* and *CE*.

4. $DE = 7$

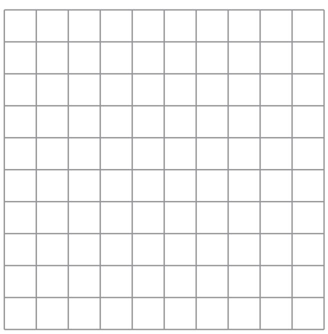


5. $DE = 12$

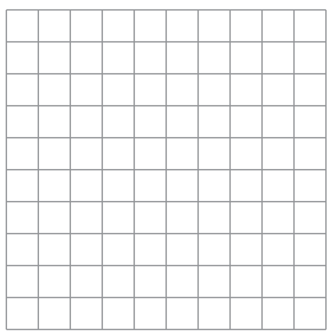


In Exercises 6–8, find the coordinates of the centroid of the triangle with the given vertices.

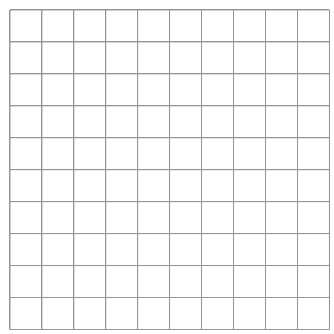
6. $A(-2, -1), B(1, 8), C(4, -1)$



7. $D(-5, 4), E(-3, -2), F(-1, 4)$

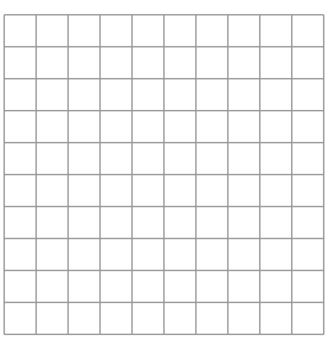


8. $J(8, 7), K(20, 5), L(8, 3)$

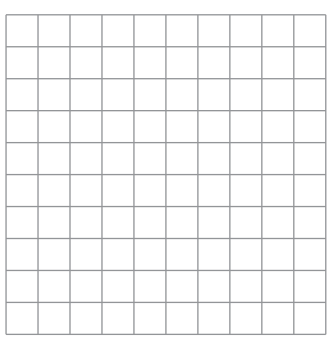


In Exercises 9–11, tell whether the orthocenter is *inside, on,* or *outside* the triangle. Then find the coordinates of the orthocenter.

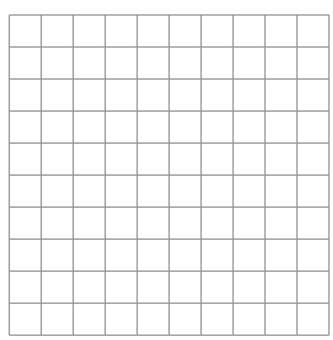
9. $X(3, 6), Y(3, 0), Z(11, 0)$



10. $L(-4, -4), M(1, 1), N(6, -4)$



11. $P(3, 4), Q(11, 4), R(9, -2)$



Name____ Date__________

6.4 The Triangle Midsegment Theorem
For use with Exploration 6.4

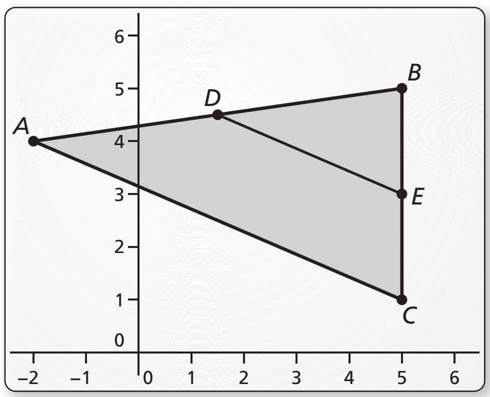
Essential Question How are the midsegments of a triangle related to the sides of the triangle?

1 EXPLORATION: Midsegments of a Triangle

Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

Work with a partner. Use dynamic geometry software. Draw any $\triangle ABC$.

a. Plot midpoint D of $\overline{AB}$ and midpoint E of $\overline{BC}$. Draw $\overline{DE}$, which is a *midsegment* of $\triangle ABC$.



Sample
Points
$A(-2, 4)$
$B(5, 5)$
$C(5, 1)$
$D(1.5, 4.5)$
$E(5, 3)$
Segments
$BC = 4$
$AC = 7.62$
$AB = 7.07$
$DE = ?$

b. Compare the slope and length of $\overline{DE}$ with the slope and length of $\overline{AC}$.

c. Write a conjecture about the relationships between the midsegments and sides of a triangle. Test your conjecture by drawing the other midsegments of $\triangle ABC$, dragging vertices to change $\triangle ABC$, and noting whether the relationships hold.

Name ____ Date __________

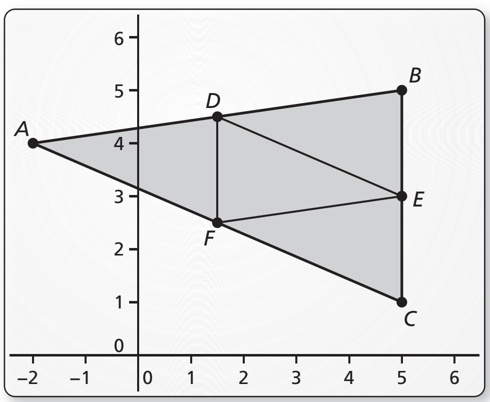
2 EXPLORATION: Midsegments of a Triangle

Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

Work with a partner. Use dynamic geometry software. Draw any $\triangle ABC$.

a. Draw all three midsegments of $\triangle ABC$.

b. Use the drawing to write a conjecture about the triangle formed by the midsegments of the original triangle.



Sample

Points	Segments
$A(-2, 4)$	$BC = 4$
$B(5, 5)$	$AC = 7.62$
$C(5, 1)$	$AB = 7.07$
$D(1.5, 4.5)$	$DE = ?$
$E(5, 3)$	$DF = ?$
	$EF = ?$

Communicate Your Answer

3. How are the midsegments of a triangle related to the sides of the triangle?

4. In $\triangle RST$, $\overline{UV}$ is the midsegment connecting the midpoints of $\overline{RS}$ and $\overline{ST}$. Given $UV = 12$, find RT.

Name____ Date____________

6.4 Notetaking with Vocabulary

For use after Lesson 6.4

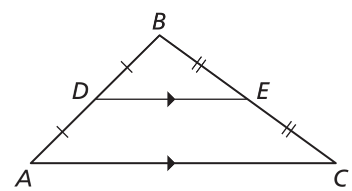
In your own words, write the meaning of each vocabulary term.

midsegment of a triangle

Theorems

Theorem 6.8 Triangle Midsegment Theorem

The segment connecting the midpoints of two sides of a triangle is parallel to the third side and is half as long as that side.



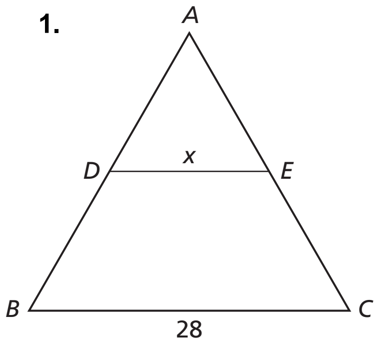
$\overline{DE}$ is a midsegment of $\triangle ABC$, $\overline{DE} \parallel \overline{AC}$, and $DE = \frac{1}{2}AC$.

Notes:

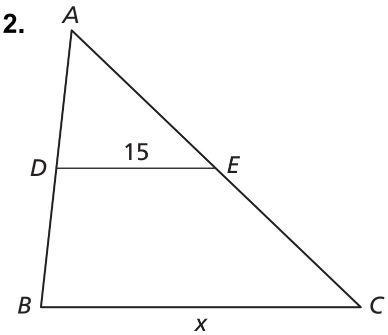
Extra Practice

In Exercises 1–3, *DE* is a midsegment of $\triangle ABC$. Find the value of *x*.

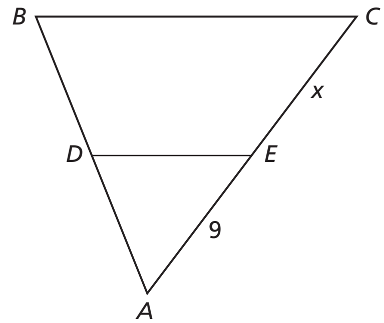
1.



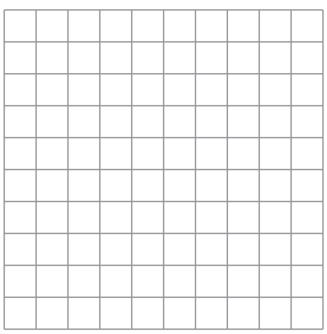
2.



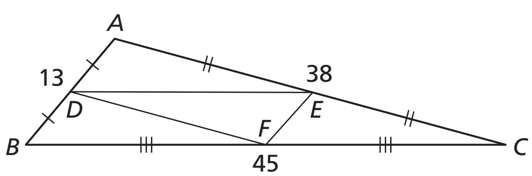
3.



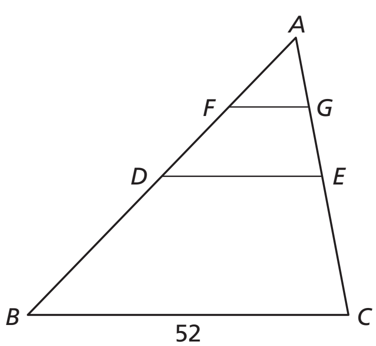
4. The vertices of a triangle are $A(-5, 6)$, $B(3, 8)$, and $C(1, -4)$. What are the vertices of the midsegment triangle?



5. What is the perimeter of $\triangle DEF$?



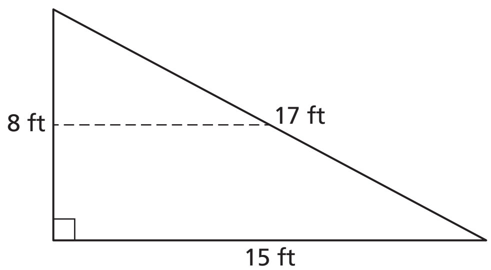
6. In the diagram, $\overline{DE}$ is a midsegment of $\triangle ABC$, and $\overline{FG}$ is a midsegment of $\triangle ADE$. Find FG.



6.4 Notetaking with Vocabulary (continued)

7. The area of $\triangle ABC$ is 48 cm^2. $\overline{DE}$ is a midsegment of $\triangle ABC$. What is the area of $\triangle ADE$?

8. The diagram below shows a triangular wood shed. You want to install a shelf halfway up the 8-foot wall that will be built between the two walls.



a. How long will the shelf be?

b. How many feet should you measure from the ground along the slanting wall to find where to attach the opposite end of the shelf so that it will be level?

Name ______________________________ Date __________

6.5 Indirect Proof and Inequalities in One Triangle

For use with Exploration 6.5

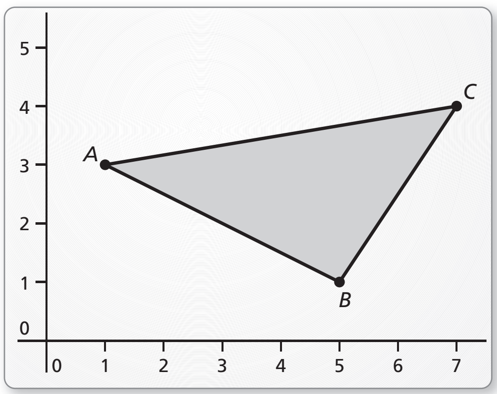
Essential Question How are the sides related to the angles of a triangle? How are any two sides of a triangle related to the third side?

1 EXPLORATION: Comparing Angle Measures and Side Lengths

Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

Work with a partner. Use dynamic geometry software. Draw any scalene $\triangle ABC$.

a. Find the side lengths and angle measures of the triangle.



Sample

Points	Angles
$A(1, 3)$	$m\angle A = ?$
$B(5, 1)$	$m\angle B = ?$
$C(7, 4)$	$m\angle C = ?$

Segments
$BC = ?$
$AC = ?$
$AB = ?$

b. Order the side lengths. Order the angle measures. What do you observe?

c. Drag the vertices of $\triangle ABC$ to form new triangles. Record the side lengths and angle measures in the following table. Write a conjecture about your findings.

BC	*AC*	*AB*	$m\angle A$	$m\angle B$	$m\angle C$

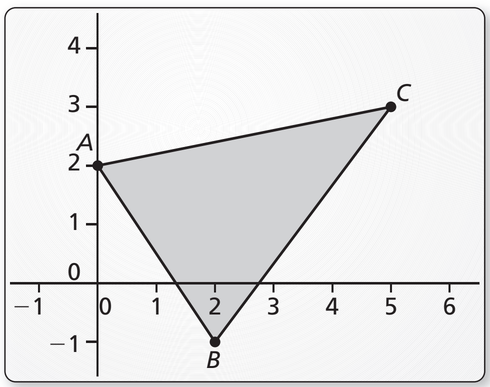
2 EXPLORATION: A Relationship of the Side Lengths of a Triangle

Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

Work with a partner. Use dynamic geometry software. Draw any $\triangle ABC$.

a. Find the side lengths of the triangle.

b. Compare each side length with the sum of the other two side lengths.



Sample
Points
$A(0, 2)$
$B(2, -1)$
$C(5, 3)$
Segments
$BC = ?$
$AC = ?$
$AB = ?$

c. Drag the vertices of $\triangle ABC$ to form new triangles and repeat parts (a) and (b). Organize your results in a table. Write a conjecture about your findings.

BC	*AC*	*AB*	Comparisons

Communicate Your Answer

3. How are the sides related to the angles of a triangle? How are any two sides of a triangle related to the third side?

4. Is it possible for a triangle to have side lengths of 3, 4, and 10? Explain.

Name ____ Date __________

6.5 Notetaking with Vocabulary
For use after Lesson 6.5

In your own words, write the meaning each vocabulary term.

indirect proof

Core Concepts

How to Write an Indirect Proof (Proof by Contradiction)

Step 1 Identify the statement you want to prove. Assume temporarily that this statement is false by assuming that its opposite is true.

Step 2 Reason logically until you reach a contradiction.

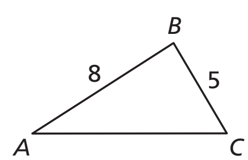
Step 3 Point out that the desired conclusion must be true because the contradiction proves the temporary assumption false.

Notes:

Theorems

Theorem 6.9 Triangle Longer Side Theorem

If one side of a triangle is longer than another side, then the angle opposite the longer side is larger than the angle opposite the shorter side.

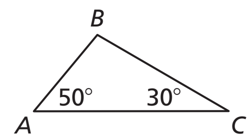


$AB > BC$, so $m\angle C > m\angle A$.

Notes:

Theorem 6.10 Triangle Larger Angle Theorem

If one angle of a triangle is larger than another angle, then the side opposite the larger angle is longer than the side opposite the smaller angle.

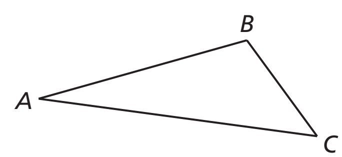


$m\angle A > m\angle C$, so $BC > AB$.

Notes:

Theorem 6.11 Triangle Inequality Theorem

The sum of the lengths of any two sides of a triangle is greater than the length of the third side.



$AB + BC > AC$ $\quad$ $AC + BC > AB$ $\quad$ $AB + AC > BC$

Notes:

Extra Practice

In Exercises 1–3, write the first step in an indirect proof of the statement.

1. Not all the students in a given class can be above average.

2. No number equals another number divided by zero.

3. The square root of 2 is not equal to the quotient of any two integers.

In Exercises 4 and 5, determine which two statements contradict each other. Explain your reasoning.

4. **A** $\triangle LMN$ is equilateral.

B $LM \neq MN$

C $\angle L = \angle M$

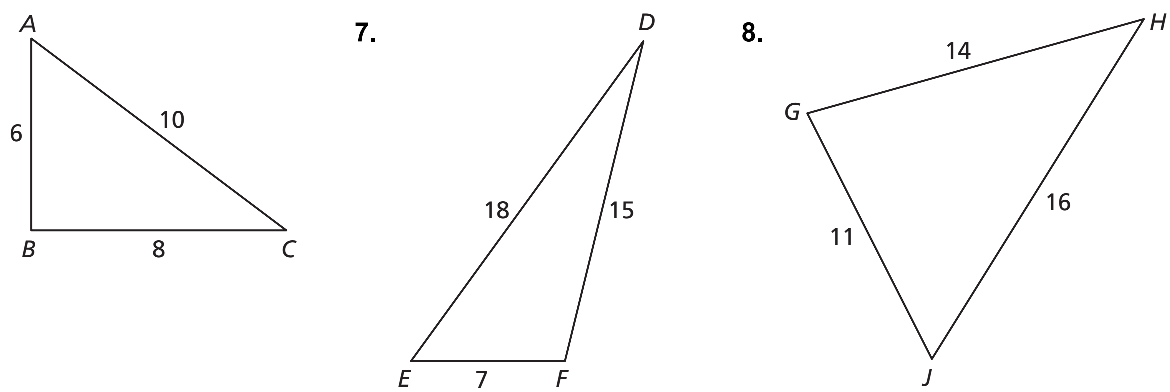
5. **A** $\triangle ABC$ is a right triangle.

B $\angle A$ is acute.

C $\angle C$ is obtuse.

In Exercises 6–8, list the angles of the given triangle from smallest to largest.

6. **7.** **8.**



In Exercises 9–12, is it possible to construct a triangle with the given side lengths? If not, explain why not.

9. 3, 12, 17 **10.** 5, 21, 16 **11.** 8, 5, 7 **12.** 10, 3, 11

13. A triangle has two sides with lengths 5 inches and 13 inches. Describe the possible lengths of the third side of the triangle.

Name____ Date__________

6.6 Inequalities in Two Triangles

For use with Exploration 6.6

Essential Question If two sides of one triangle are congruent to two sides of another triangle, what can you say about the third sides of the triangles?

1 EXPLORATION: Comparing Measures in Triangles

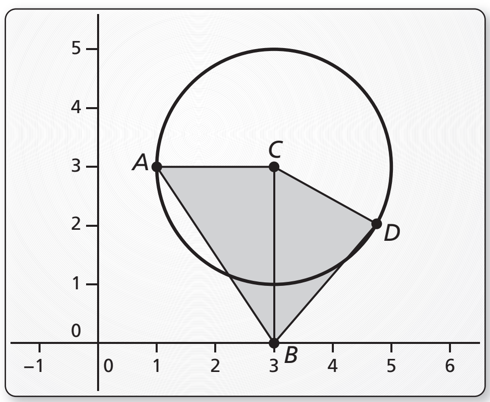
Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

Work with a partner. Use dynamic geometry software.

a. Draw $\triangle ABC$, as shown below.

b. Draw the circle with center $C(3, 3)$ through the point $A(1, 3)$.

c. Draw $\triangle DBC$ so that D is a point on the circle.



Sample
Points
$A(1, 3)$
$B(3, 0)$
$C(3, 3)$
$D(4.75, 2.03)$
Segments
$BC = 3$
$AC = 2$
$DC = 2$
$AB = 3.61$
$DB = 2.68$

d. Which two sides of $\triangle ABC$ are congruent to two sides of $\triangle DBC$? Justify your answer.

e. Compare the lengths of $\overline{AB}$ and $\overline{DB}$. Then compare the measures of $\angle ACB$ and $\angle DCB$. Are the results what you expected? Explain.

f. Drag point D to several locations on the circle. At each location, repeat part (e). Copy and record your results in the table below.

	D	*AC*	*BC*	*AB*	*BD*	$m\angle ACB$	$m\angle BCD$
1.	(4.75, 2.03)	2	3				
2.		2	3				
3.		2	3				
4.		2	3				
5.		2	3				

Name ____ Date __________

6.6 Inequalities in Two Triangles (continued)

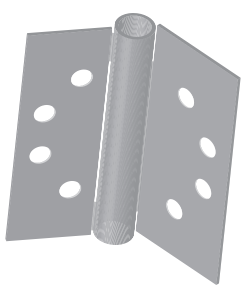
1 EXPLORATION: Comparing Measures in Triangles (continued)

g. Look for a pattern of the measures in your table. Then write a conjecture that summarizes your observations.

Communicate Your Answer

2. If two sides of one triangle are congruent to two sides of another triangle, what can you say about the third sides of the triangles?

3. Explain how you can use the hinge shown below to model the concept described in Question 2.



Name______________________________ Date__________

6.6 Notetaking with Vocabulary
For use after Lesson 6.6

In your own words, write the meaning of each vocabulary term.

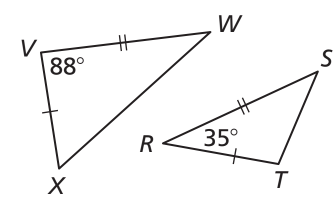
indirect proof

inequality

Theorems

Theorem 6.12 Hinge Theorem

If two sides of one triangle are congruent to two sides of another triangle, and the included angle of the first is larger than the included angle of the second, then the third side of the first is longer than the third side of the second.

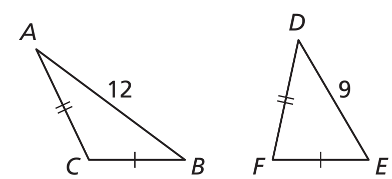


$WX > ST$

Notes:

Theorem 6.13 Converse of the Hinge Theorem

If two sides of one triangle are congruent to two sides of another triangle, and the third side of the first is longer than the third side of the second, then the included angle of the first is larger than the included angle of the second.



$m\angle C > m\angle F$

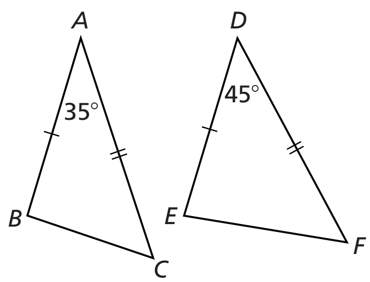
Notes:

Name ______________________________ Date __________

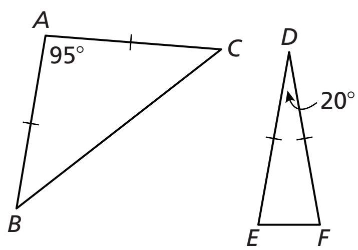
Extra Practice

In Exercises 1–9, complete the statement with <, >, or =. Explain your reasoning.

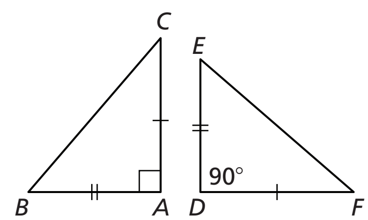
1. BC _____ EF



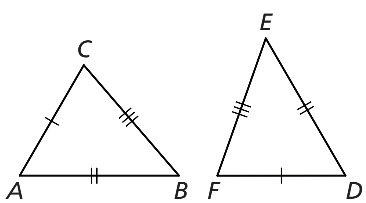
2. BC _____ EF



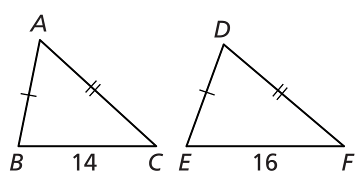
3. BC _____ EF



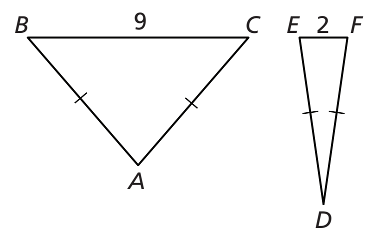
4. $m\angle A$ _____ $m\angle D$



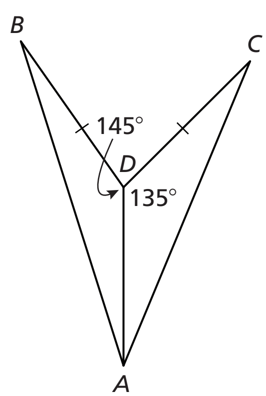
5. $m\angle A$ _____ $m\angle D$



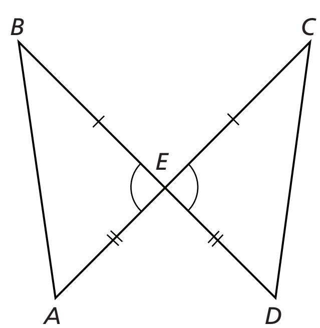
6. $m\angle A$ _____ $m\angle D$



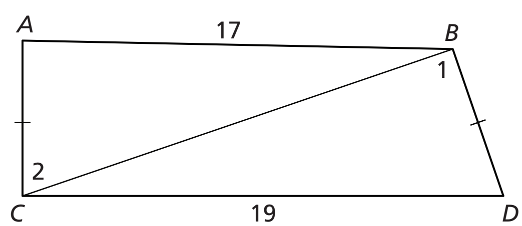
7. AB _____ AC



8. AB _____ CD



9. $m\angle 1$ _____ $m\angle 2$

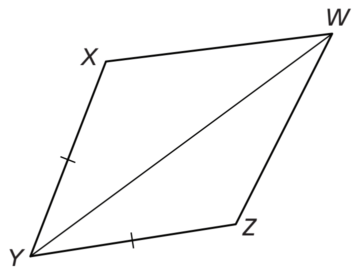


6.6 Notetaking with Vocabulary (continued)

In Exercises 10 and 11, write a proof.

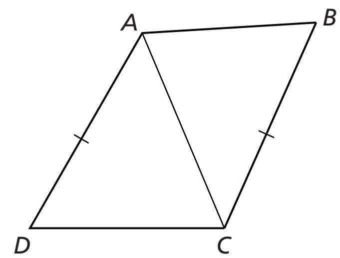
10. **Given** $\overline{XY} \cong \overline{YZ}$, $WX > WZ$

Prove $m\angle WYX > m\angle WYZ$



11. **Given** $\overline{AD} \cong \overline{BC}$, $m\angle DAC > m\angle ACB$

Prove $DC > AB$



12. Loop a rubber band around the blade ends of a pair of scissors. Describe what happens to the rubber band as you open the scissors. How does that relate to the Hinge Theorem?

13. Starting from a point 10 miles north of Crow Valley, a crow flies northeast for 5 miles. Another crow, starting from a point 10 miles south of Crow Valley, flies due west for 5 miles. Which crow is farther from Crow Valley? Explain.