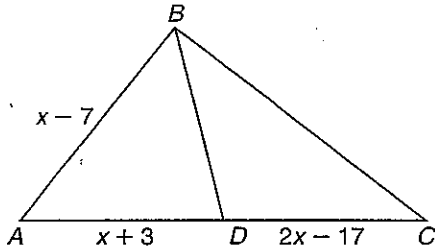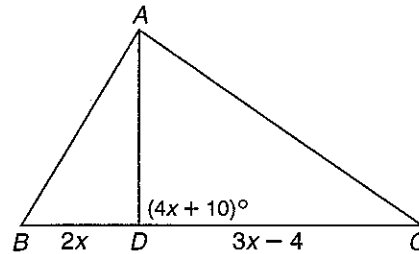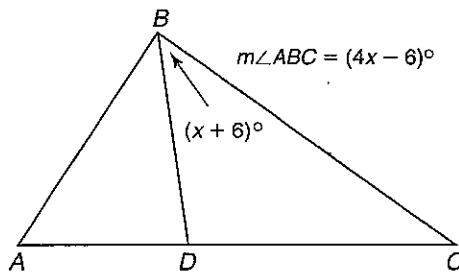**5-1**

Practice

Special Segments in Triangles

1. Find AB if $\overline{BD}$ is a median of $\triangle ABC$.

2. Find BC if $\overline{AD}$ is an altitude of $\triangle ABC$.

3. Find $m\angle ABC$ if $\overline{BD}$ is an angle bisector of $\triangle ABC$.

In Exercises 4–6, A(2, 5), B(12, –1), and C(–6, 8) are the vertices of △ABC.
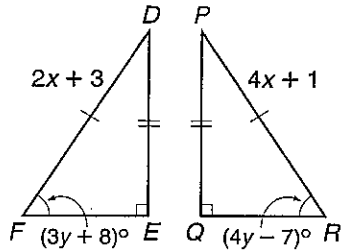
4. What are the coordinates of K if $\overline{CK}$ is a median of $\triangle ABC$?

5. What is the slope of the perpendicular bisector of $\overline{AB}$? What is the slope of $\overline{CL}$ if $\overline{CL}$ is the altitude from point C?

6. Point N on $\overrightarrow{BC}$ has coordinates $\left(\frac{8}{5}, \frac{21}{5}\right)$. Is $\overline{NA}$ an altitude of $\triangle ABC$? Explain your answer.
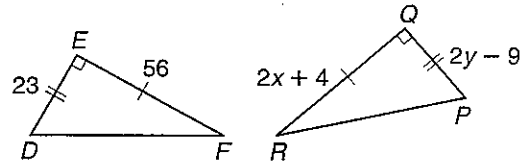
NAME_____ DATE _____

Practice

Right Triangles

**For each figure, find the values of x and y so that
△ DEF ≅ △ PQR by the indicated theorem or postulate.**

1. HA

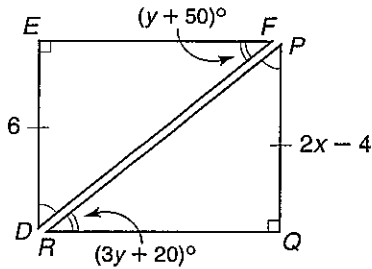$2x + 3$ $4x + 1$

F $(3y + 8)°$ E Q $(4y - 7)°$ R

2. LL

E Q

23 56 $2x + 4$ $2y - 9$

D F R P

3. LA

E $(y + 50)°$ F P

6 $2x - 4$

D R $(3y + 20)°$ Q

4. HL

73 F

D 37 E

Q

$2x - 1$

P $3y + 4$ R

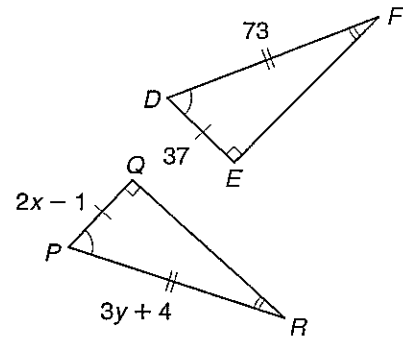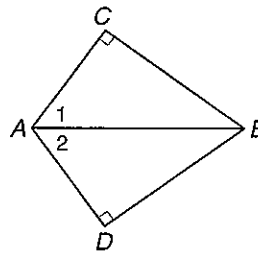**5.** Write a two-column proof.
   Given: $\overline{AB}$ bisects $\angle DAC$
   $\angle C$ and $\angle D$ are right angles.
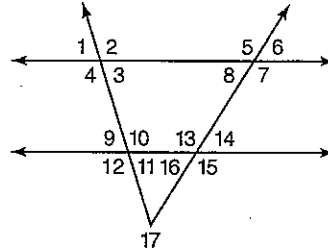   **Prove:** $\overline{BC} \cong \overline{BD}$
   Proof:

C

A $\begin{matrix}1\\2\end{matrix}$ B

D

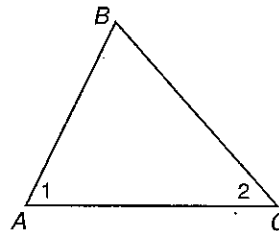| Statements	Reasons

Indirect Proof and Inequalities

Use the figure at the right to complete each statement with either < or >.

1. $\angle 4$ _?_ $\angle 8$

2. $\angle 13$ _?_ $\angle 11$

3. $\angle 17$ _?_ $\angle 8$

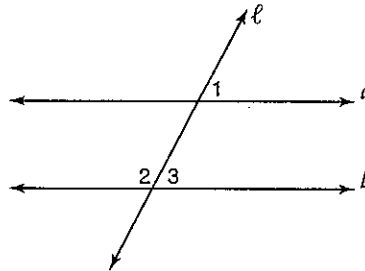4. If $m\angle 15 = m\angle 7$ then $m\angle 11$ _?_ $m\angle 7$.

Write an indirect proof.

5. **Given:** $m\angle 1 \neq m\angle 2$
   Prove: $\triangle ABC$ is not an isosceles triangle with vertex B.

6. **Given:** $m\angle 1 + m\angle 2 \neq 180$
   Prove: $a \nparallel b$

7. **Work Backward** Joe spent half of the money in his wallet on a table for his computer printer. He then spent $8.12 for a printer ribbon. Then he spent half of what he had left on supplies for his office. He then had $14.50 remaining. How much money did Joe have to start with?

Practice

Inequalities for Sides and Angles of a Triangle

Refer to the figure on the right for Exercises 1–4.

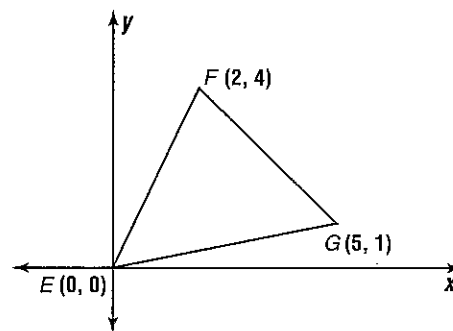1. Name the shortest and the longest segments in $\triangle BCD$.
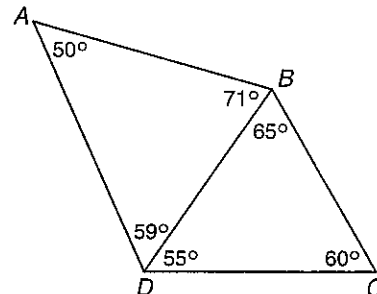
2. Name the shortest and the longest segments in $\triangle ABD$.

3. Find the shortest segment in the figure.

4. How many of the segments in the figure are longer than $\overline{BD}$?

5. List the angles in order from least to greatest.

6. List the sides of $\triangle MNO$ in order from longest to shortest if $m\angle M = 4x + 20$, $m\angle N = 2x + 10$, and $m\angle O = 3x - 20$.

7. List the angles of $\triangle KLM$ in order from least to greatest if $KL = x - 4$, $LM = x + 4$, $KM = 2x - 1$, and the perimeter of $\triangle KLM$ is 27.

Practice

The Triangle Inequality

Determine whether it is possible to draw a triangle with sides
of the given measure. Write <u>yes</u> or <u>no</u>.

1. 3, 3, 3

2. 2, 3, 4

3. 1, 2, 3

4. 8.9, 9.3, 18.3

5. 16.5, 20.5, 38.5

6. 19, 19, 0.5

Determine whether it is possible to have a triangle with the
given vertices. Write <u>yes</u> or <u>no</u>, and explain your answer.

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

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

9. $A(2, 5), B(-3, 5), C(6, -1)$

10. $A(3, -6), B(1, 2), C(-2, 10)$

Two sides of a triangle are 21 and 24 inches long. Determine
whether each measurement can be the length of the third
side.

11. 3 inches

12. 40 inches

13. 56 inches

If the sides of a triangle have the following lengths, find all
possible values for x.
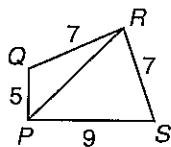
14. $AB = 2x + 5, BC = 3x - 2, AC = 4x - 8$

15. $PQ = 3x, QR = 4x - 7, PR = 2x + 9$
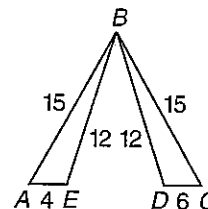
NAME_____ DATE _____

Practice

Inequalities Involving Two Triangles

Refer to each figure to write an inequality relating the given pair of angle measures.
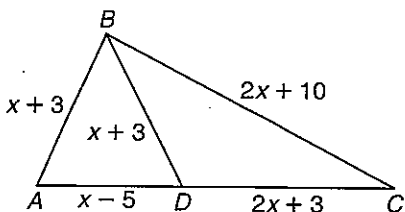
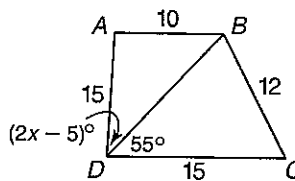**1.** $m\angle PRQ$, $m\angle PRS$

2. $m\angle ABE$, $m\angle DBC$

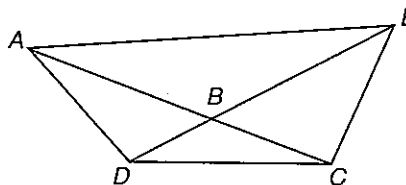**Write an inequality or pair of inequalities to describe the possible values of x.**

3.

4.

Write a two-column proof.

5. Given: $\overline{AD} \cong \overline{EC}$
$\quad\quad\quad\quad m\angle ADC > m\angle ECD$
Prove: $AC > ED$
Proof:

Statements	Reasons

6. Given: D is the midpoint of $\overline{AC}$.
$\quad\quad\quad\quad BC > AB$
Prove: $m\angle 1 > m\angle 2$
Proof:

Statements	Reasons

Geometry