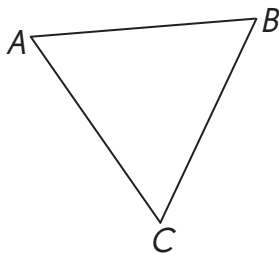
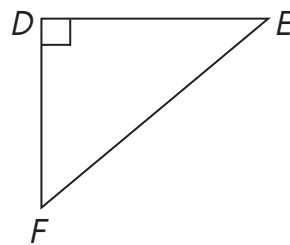


**Chapter**  
**13****Properties of Triangles  
and Four-sided Figures****Practice 1 Classifying Triangles**

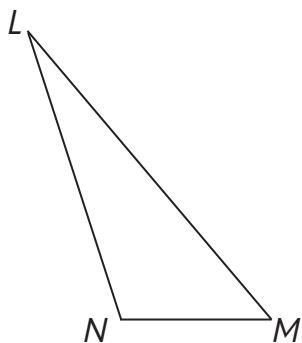
Which of these triangles are equilateral, isosceles, or scalene?  
Use a centimeter ruler to find out.

**1.**

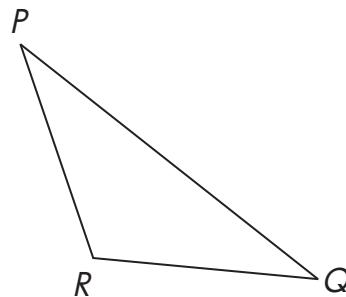
Triangle  $ABC$  is a/an  
\_\_\_\_\_ triangle.

**2.**

Triangle  $DEF$  is a/an  
\_\_\_\_\_ triangle.

**3.**

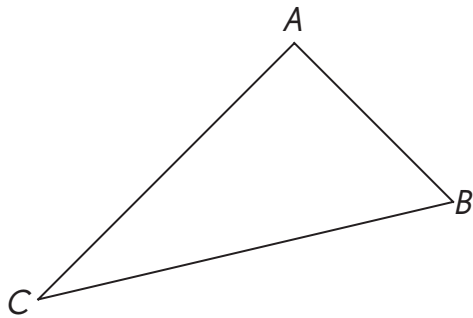
Triangle  $LMN$  is a/an  
\_\_\_\_\_ triangle.

**4.**

Triangle  $PQR$  is a/an  
\_\_\_\_\_ triangle.

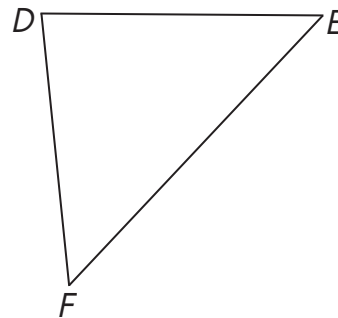
**Which of these triangles are right, obtuse, or acute?  
Use a protractor to find out.**

**5.**



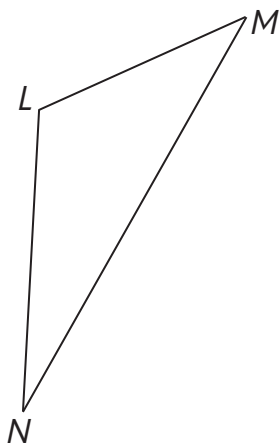
Triangle  $ABC$  is a/an  
\_\_\_\_\_ triangle.

**6.**



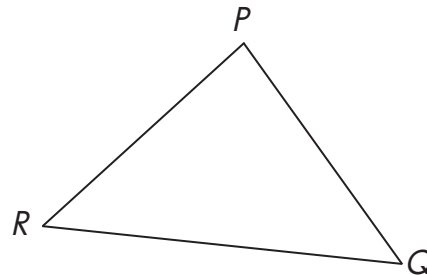
Triangle  $DEF$  is a/an  
\_\_\_\_\_ triangle.

**7.**



Triangle  $LMN$  is a/an  
\_\_\_\_\_ triangle.

**8.**

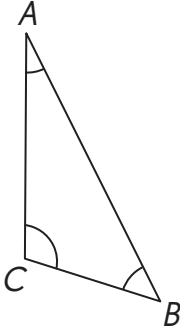


Triangle  $PQR$  is a/an  
\_\_\_\_\_ triangle.

## Practice 2 Measures of Angles of a Triangle

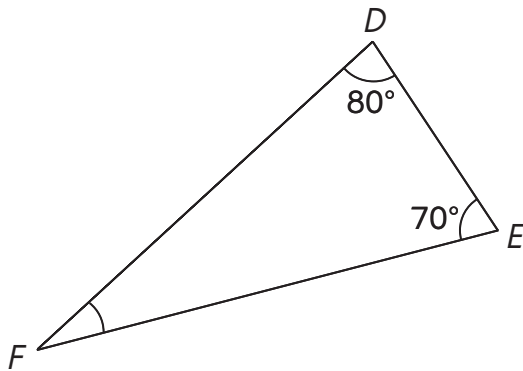
Complete.

1.



$$m\angle A + m\angle B + m\angle C = \underline{\hspace{2cm}}$$

2.

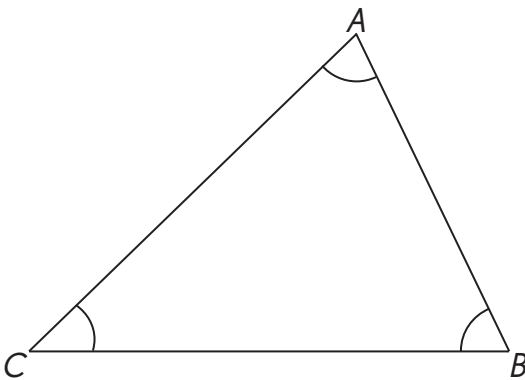


$$80^\circ + 70^\circ + m\angle F = \underline{\hspace{2cm}}$$

$$m\angle F = \underline{\hspace{2cm}}$$

Measure the angles of the triangle. Then fill in the blanks.

3.



$$m\angle A = \underline{\hspace{2cm}}$$

$$m\angle B = \underline{\hspace{2cm}}$$

$$m\angle C = \underline{\hspace{2cm}}$$

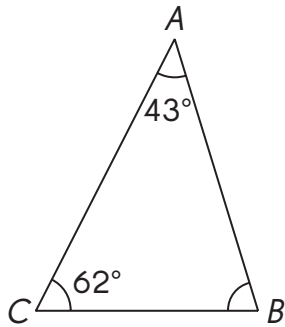
$$m\angle A + m\angle B + m\angle C = \underline{\hspace{2cm}} + \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$$

$$= \underline{\hspace{2cm}}$$

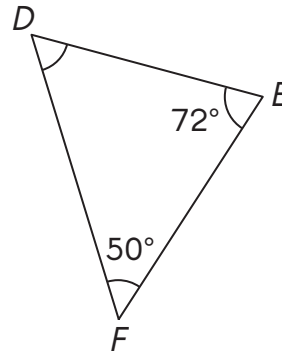
The sum of the angle measures in the triangle is \_\_\_\_\_.

**These triangles are not drawn to scale. Find the unknown angle measures.**

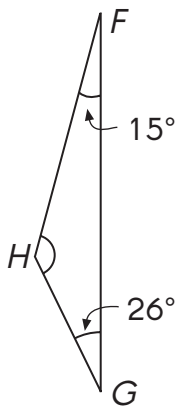
**4.** Find the measure of  $\angle B$ .



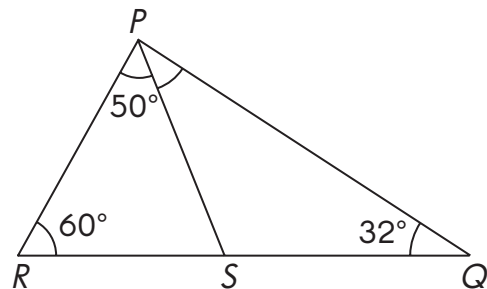
**5.** Find the measure of  $\angle D$ .



**6.** Find the measure of  $\angle H$ .



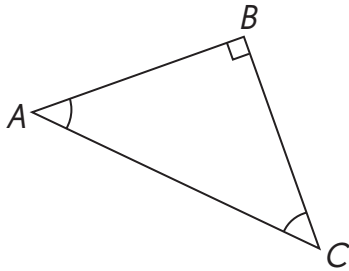
**7.** Find the measure of  $\angle QPS$ .



## Practice 3 Right, Isosceles, and Equilateral Triangles

Complete. *ABC* and *EFG* are right triangles.

1.

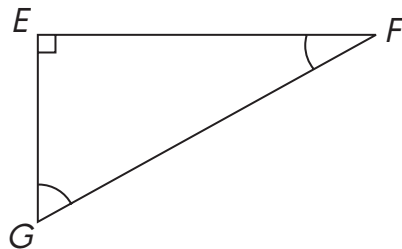


$$m\angle B = \underline{\hspace{2cm}}$$

$$m\angle A + m\angle C = \underline{\hspace{2cm}} - \underline{\hspace{2cm}}$$

$$= \underline{\hspace{2cm}}$$

2.

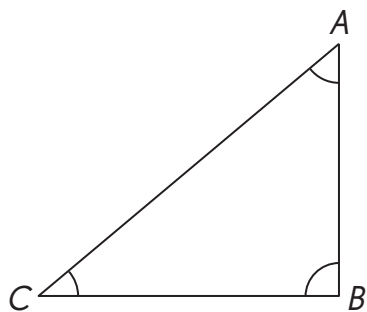


$$m\angle E = \underline{\hspace{2cm}}$$

$$m\angle F + m\angle G = \underline{\hspace{2cm}}$$

Measure the angles of the triangle. Then fill in the blanks.

3.



$$m\angle A = \underline{\hspace{2cm}}$$

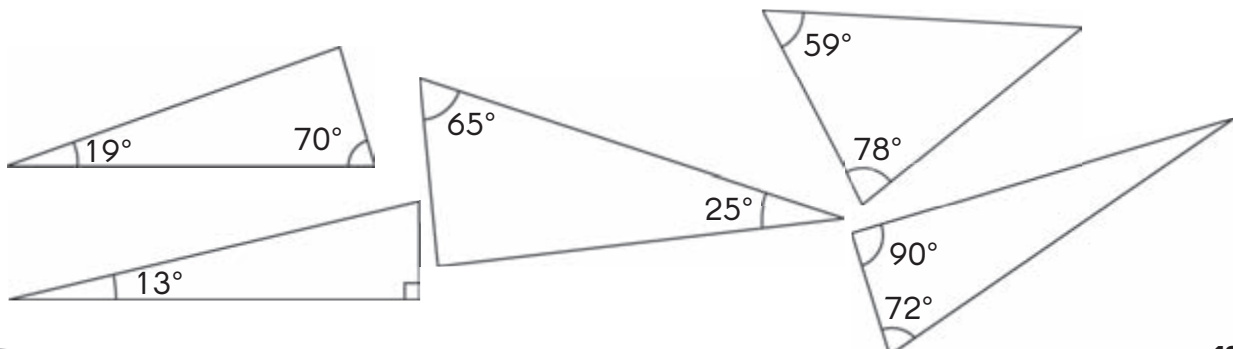
$$m\angle B = \underline{\hspace{2cm}}$$

$$m\angle C = \underline{\hspace{2cm}}$$

$$m\angle A + m\angle C = \underline{\hspace{2cm}}$$

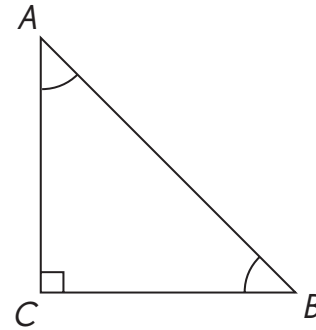
These triangles are not drawn to scale. Identify and shade the right triangles.

4.

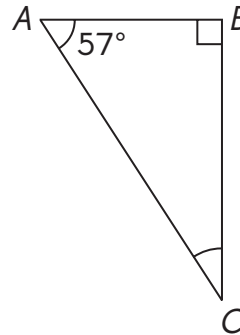


**These triangles are not drawn to scale. Find the unknown angle measures.**

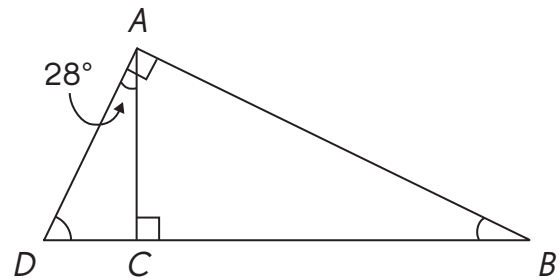
5. Find the sum of the measures of  $\angle A$  and  $\angle B$ .



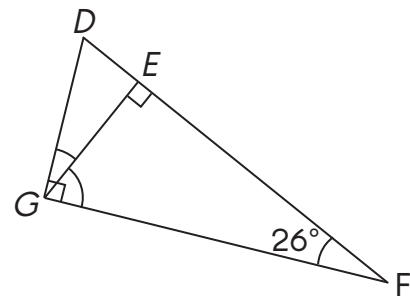
6. Find the measure of  $\angle C$ .



7. Find the measures of  $\angle ADC$  and  $\angle ABC$ .

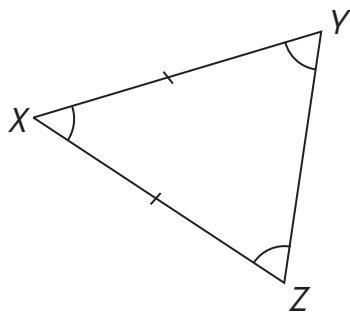


8. Find the measures of  $\angle EGF$  and  $\angle DGE$ .



**Complete.  $XYZ$  and  $PQR$  are isosceles triangles.**

9.



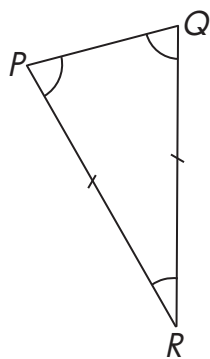
Which two sides are of equal length?

\_\_\_\_\_

Which two angles have equal measures?

\_\_\_\_\_

10.



Which two sides are of equal length?

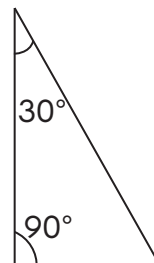
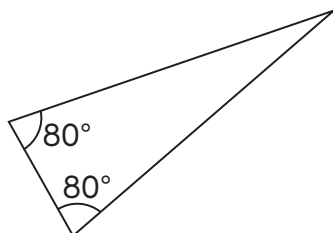
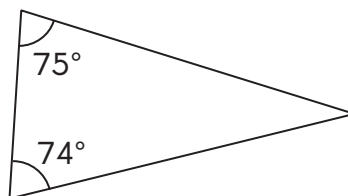
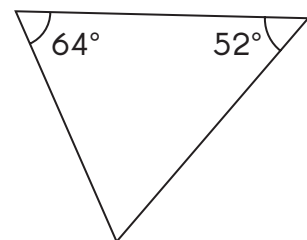
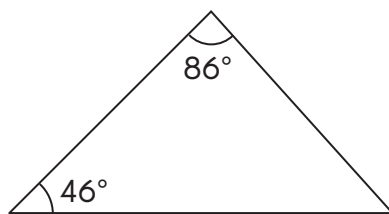
\_\_\_\_\_

Which two angles have equal measures?

\_\_\_\_\_

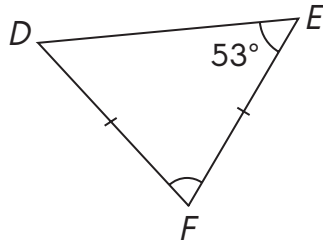
**These triangles are not drawn to scale. Identify and shade the isosceles triangles.**

11.

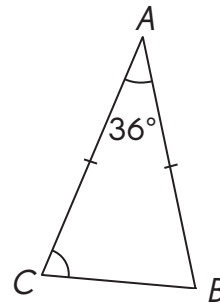


**These triangles are not drawn to scale. Find the unknown angle measures.**

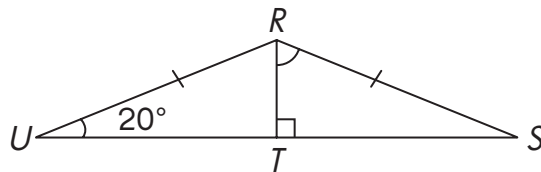
**12.** Find the measure of  $\angle F$ .



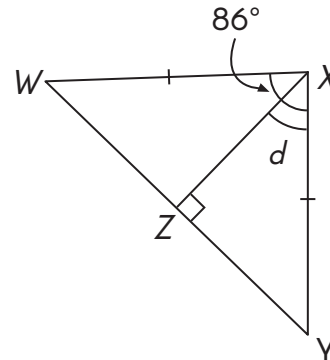
**13.** Find the measure of  $\angle C$ .



**14.** Find the measure of  $\angle TRS$ .



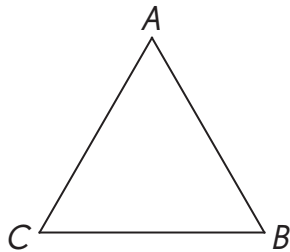
**15.** Find the measure of  $\angle d$ .





**Complete. Use your protractor and centimeter ruler to measure the sides and angles. Which figure is an equilateral triangle? Check the box.**

16.



$$AB = \underline{\hspace{2cm}} \text{ cm}$$

$$BC = \underline{\hspace{2cm}} \text{ cm}$$

$$AC = \underline{\hspace{2cm}} \text{ cm}$$

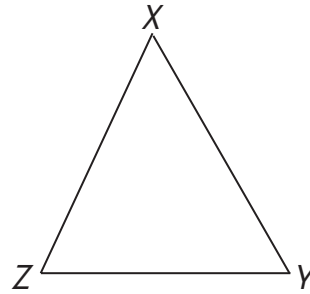
$$m\angle A = \underline{\hspace{2cm}}$$

$$m\angle B = \underline{\hspace{2cm}}$$

$$m\angle C = \underline{\hspace{2cm}}$$



17.



$$XY = \underline{\hspace{2cm}} \text{ cm}$$

$$YZ = \underline{\hspace{2cm}} \text{ cm}$$

$$XZ = \underline{\hspace{2cm}} \text{ cm}$$

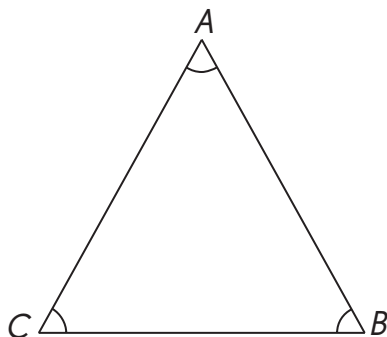
$$m\angle X = \underline{\hspace{2cm}}$$

$$m\angle Y = \underline{\hspace{2cm}}$$

$$m\angle Z = \underline{\hspace{2cm}}$$



**Complete.  $ABC$  is an equilateral triangle.**



**18.** Which angles have measures equal to the measure of  $\angle A$ ?

\_\_\_\_\_

**19.** Which sides have lengths equal to the length of  $\overline{AB}$ ?

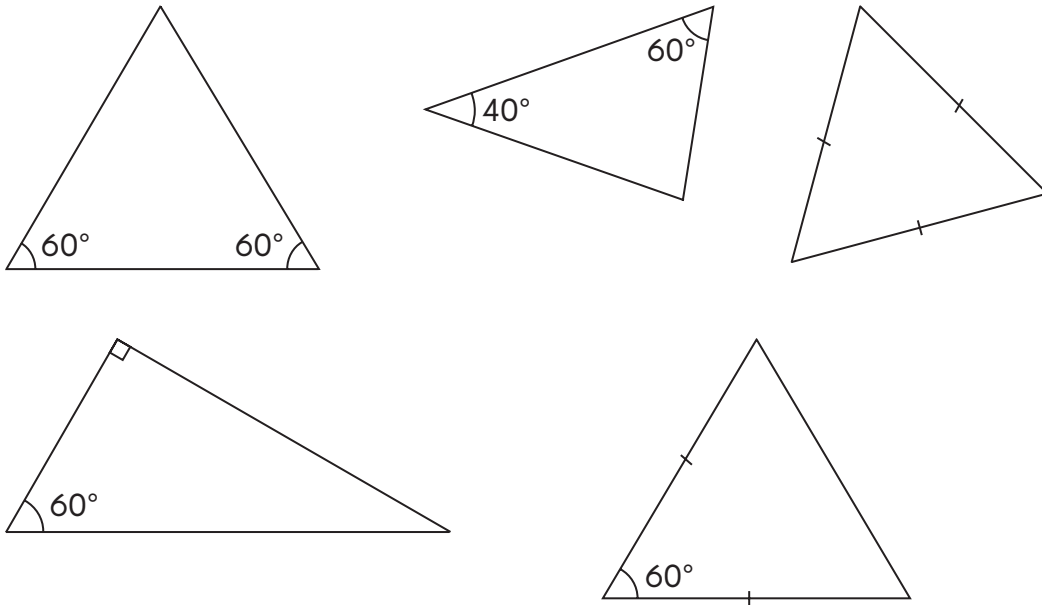
\_\_\_\_\_

**20.** What can you say about the angles of triangle  $ABC$ ?

\_\_\_\_\_

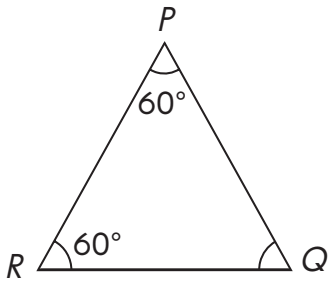
**These triangles are not drawn to scale. Identify and shade the equilateral triangles.**

**21.**

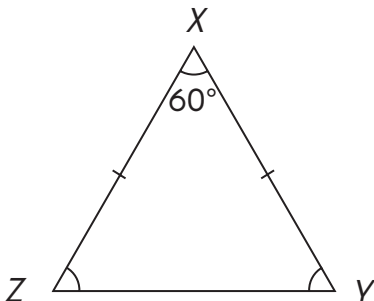


**These triangles are not drawn to scale. Find the unknown angle measures.**

**22.** Find the measure of  $\angle Q$ .

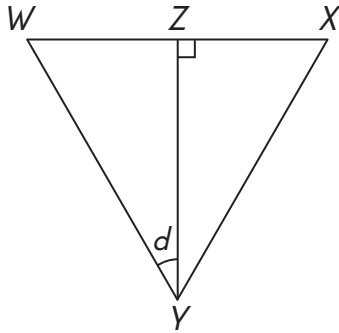


**23.** Find the measures of  $\angle Y$  and  $\angle Z$ .

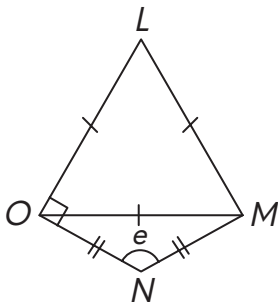


**These triangles are not drawn to scale. Find the unknown angle measures.**

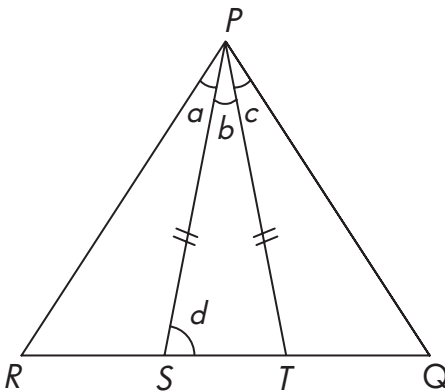
- 24.**  $WX = XY = YW$ . Find the measure of  $\angle d$ .




- 25.** Find the measure of  $\angle e$ .



- 26.** Triangle  $PQR$  is an equilateral triangle. Triangle  $PST$  is an isosceles triangle. The measures of  $\angle a$ ,  $\angle b$ , and  $\angle c$  are the same. Find the measure of  $\angle d$ .





# Math Journal

- 1.** A teacher asked her students to sketch and label the angles of a triangle. These are the angle measures that three students chose to draw.

Wayne:  $120^\circ, 80^\circ, 10^\circ$  Ashley:  $70^\circ, 28^\circ, 72^\circ$  Frank:  $51^\circ, 37^\circ, 92^\circ$

Will each student be able to draw his or her triangle? Explain your answer.

Wayne: \_\_\_\_\_

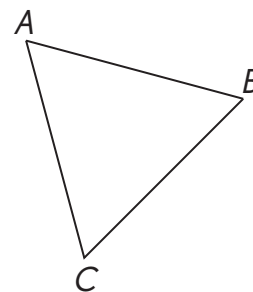
Ashley: \_\_\_\_\_

Frank: \_\_\_\_\_

- 2.** What are two ways to identify an isosceles triangle?

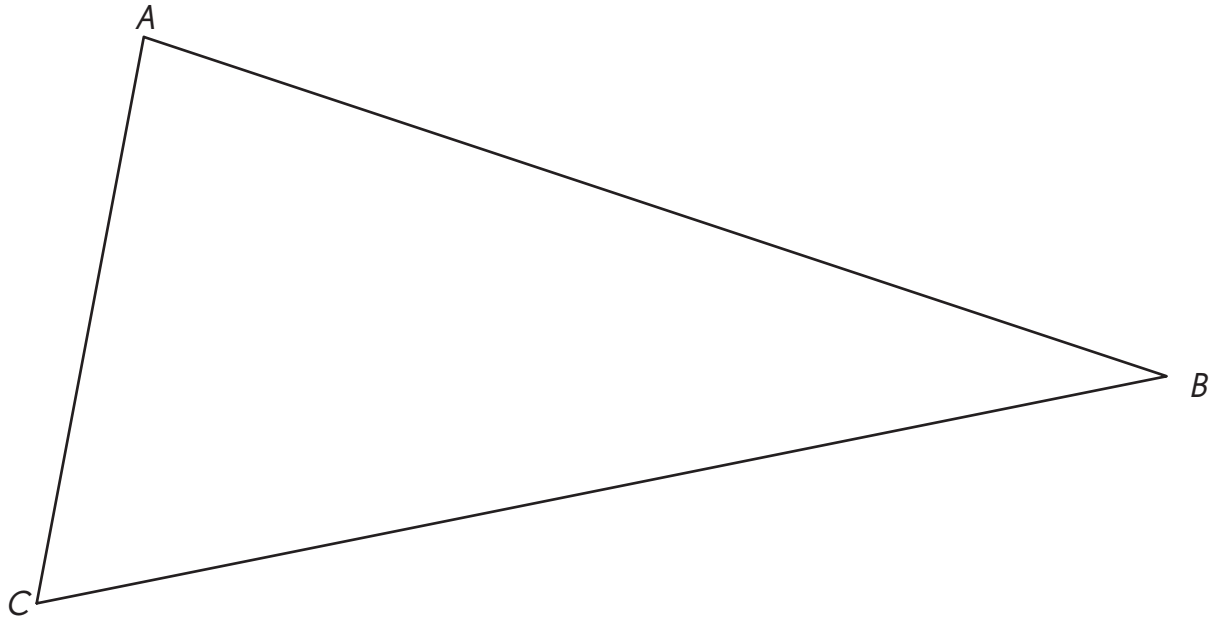
- 3.** Jordan is measuring the angles of a triangle. He finds out that  $m\angle A = m\angle B = 60^\circ$ . Without measuring  $\angle C$ , he says that triangle  $ABC$  is an equilateral triangle.

Is he correct? Explain why.



## Practice 4 Triangle Inequalities

Complete. Measure the sides of the triangle to the nearest half inch. Then fill in the blanks.

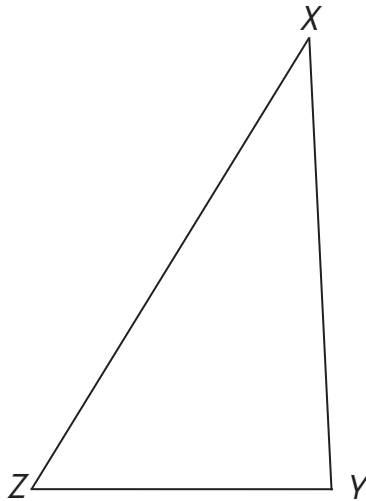


1.  $AB =$  \_\_\_\_\_ in.      2.  $BC =$  \_\_\_\_\_ in.  
3.  $AC =$  \_\_\_\_\_ in.      4.  $AB + BC =$  \_\_\_\_\_ in.  
5.  $BC + AC =$  \_\_\_\_\_ in.      6.  $AB + AC =$  \_\_\_\_\_ in.

Use your answers in Exercises 4 to 6. Fill in the blanks with **Yes** or **No**.

7. Is  $AB + BC > AC$ ? \_\_\_\_\_  
8. Is  $BC + AC > AB$ ? \_\_\_\_\_  
9. Is  $AB + AC > BC$ ? \_\_\_\_\_

**Complete. Measure the sides of the triangle to the nearest centimeter. Then fill in the blanks.**



10.  $XY =$  \_\_\_\_\_ cm

11.  $YZ =$  \_\_\_\_\_ cm

12.  $XZ =$  \_\_\_\_\_ cm

13.  $XY + YZ =$  \_\_\_\_\_ cm

14.  $YZ + XZ =$  \_\_\_\_\_ cm

15.  $XY + XZ =$  \_\_\_\_\_ cm

**Use your answers in Exercises 10 to 15. Write the sides of the triangle to make the inequalities true.**

16.  $XY + YZ >$  \_\_\_\_\_

17.  $YZ + XZ >$  \_\_\_\_\_

18.  $XY + XZ >$  \_\_\_\_\_

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Show whether it is possible to form triangles with these lengths.**

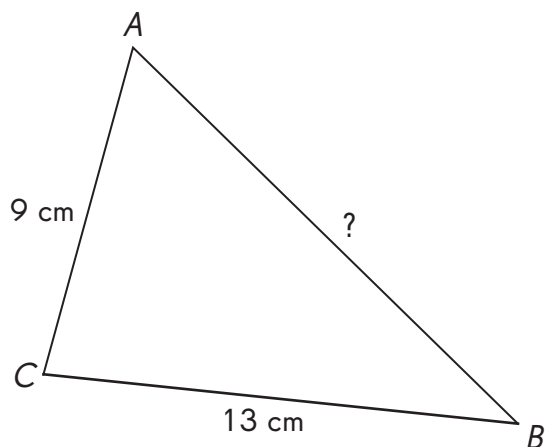
**19.** 6 in., 8 in., 12 in.

**20.** 9 in., 13 in., 3 in.

**21.** 2 cm, 4 cm, 7 cm

The lengths of two sides of each triangle are given. Name a possible length for the third side. The lengths are in whole centimeters or whole inches.

22.

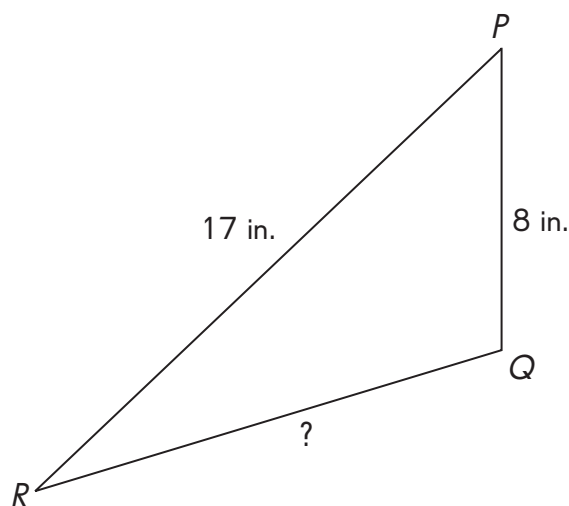


$\overline{AB}$  is greater than 10 centimeters.

A possible length for  $\overline{AB}$  is

\_\_\_\_\_ centimeters.

23.



$\overline{QR}$  is greater than 9 inches.

A possible length for  $\overline{QR}$  is

\_\_\_\_\_ inches.

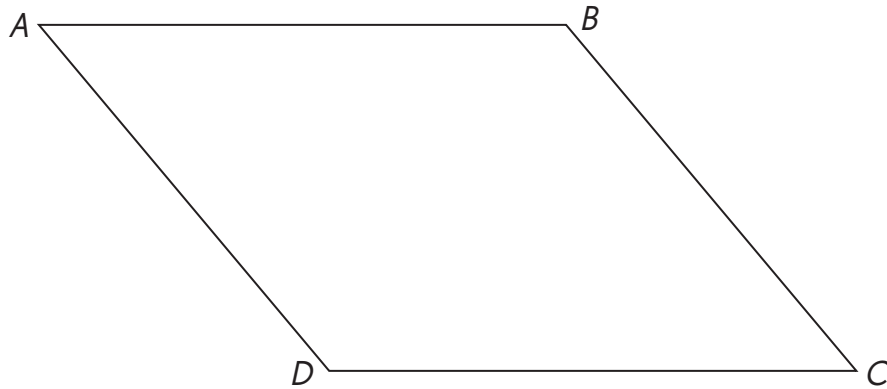
**Solve.**

24. In the triangle  $\overline{EFG}$ ,  $EF = 21$  centimeters,  $FG = 11$  centimeters. The length of  $\overline{EG}$  is in whole centimeters and is greater than 25 centimeters. What is a possible length of  $\overline{EG}$ ?



## Practice 5 Parallelogram, Rhombus, and Trapezoid

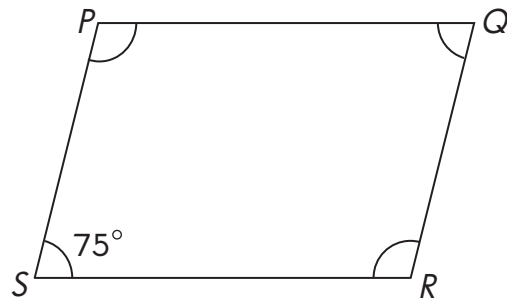
Complete. Figure  $ABCD$  is a parallelogram. Measure the sides and angles of the figure.



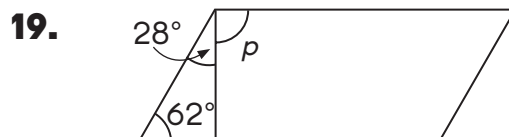
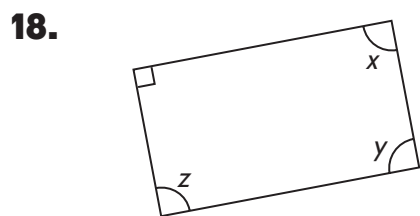
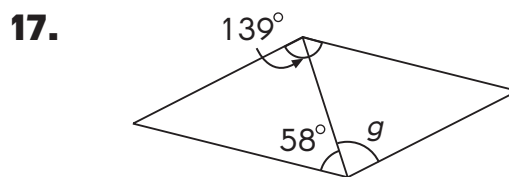
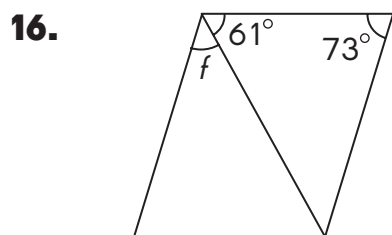
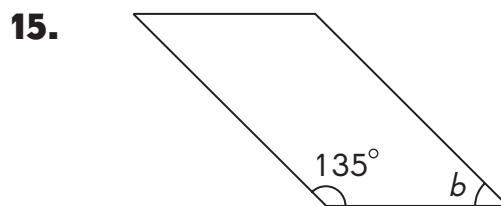
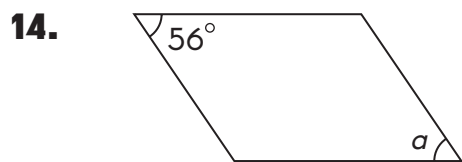
1.  $AD =$  \_\_\_\_\_ cm
2.  $AB =$  \_\_\_\_\_ cm
3.  $BC =$  \_\_\_\_\_ cm
4.  $DC =$  \_\_\_\_\_ cm
5.  $m\angle A =$  \_\_\_\_\_
6.  $m\angle B =$  \_\_\_\_\_
7.  $m\angle C =$  \_\_\_\_\_
8.  $m\angle D =$  \_\_\_\_\_
9. Name the parallel sides of the figure. \_\_\_\_\_
10. Name the opposite angles that are equal. \_\_\_\_\_

This parallelogram is not drawn to scale. Fill in the blanks.

11.  $m\angle Q = m\angle$  \_\_\_\_\_  
= \_\_\_\_\_
12.  $m\angle P = 180^\circ -$  \_\_\_\_\_  
= \_\_\_\_\_
13.  $m\angle R = m\angle$  \_\_\_\_\_  
= \_\_\_\_\_



**These parallelograms are not drawn to scale.  
Find the unknown angle measures.**



Name: \_\_\_\_\_

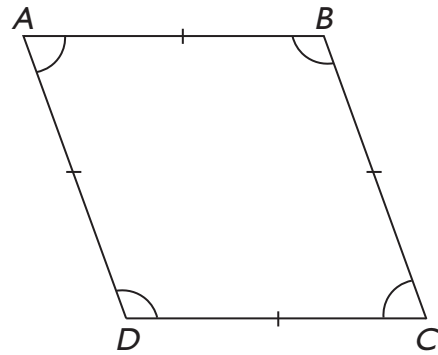
Date: \_\_\_\_\_

**Complete. Write the name of another side or angle of each rhombus.**

20.  $AB = BC$   
 $=$  \_\_\_\_\_  $=$  \_\_\_\_\_

21.  $m\angle B = m\angle$  \_\_\_\_\_

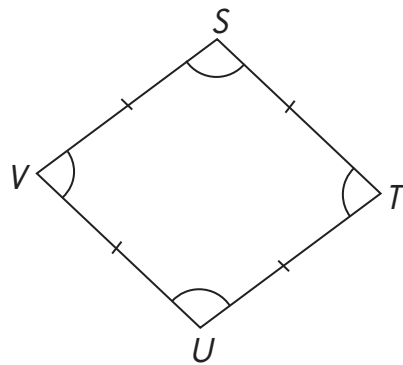
22.  $m\angle A = m\angle$  \_\_\_\_\_



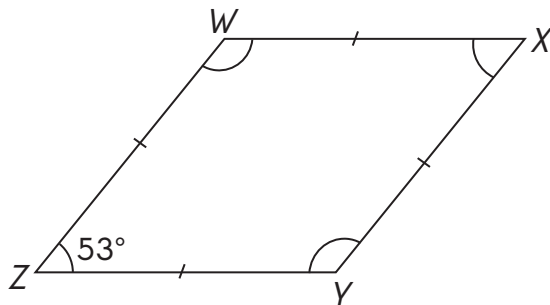
23.  $UV =$  \_\_\_\_\_  
 $=$  \_\_\_\_\_  $=$  \_\_\_\_\_

24.  $m\angle S = m\angle$  \_\_\_\_\_

25.  $m\angle T = m\angle$  \_\_\_\_\_



**This rhombus is not drawn to scale. Fill in the blanks.**



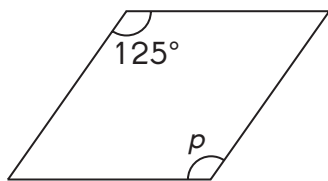
26.  $m\angle X = m\angle$  \_\_\_\_\_  $=$  \_\_\_\_\_

27.  $m\angle W =$  \_\_\_\_\_  $-$  \_\_\_\_\_  $=$  \_\_\_\_\_

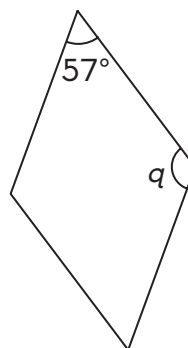
28.  $m\angle Y = m\angle$  \_\_\_\_\_  $=$  \_\_\_\_\_

**These rhombuses are not drawn to scale.  
Find the unknown angle measures.**

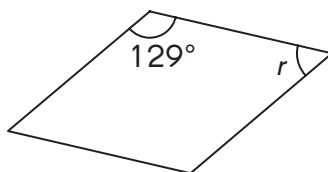
**29.**



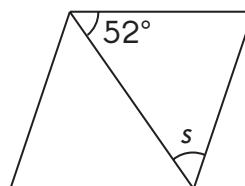
**30.**



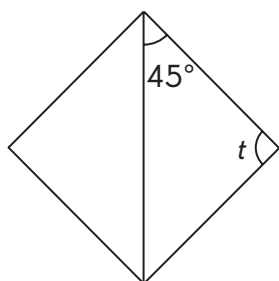
**31.**



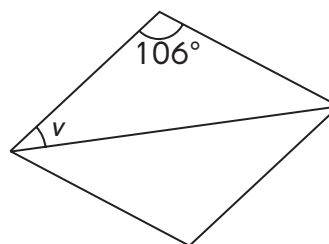
**32.**



**33.**



**34.**



Measure the unknown angles. Then fill in the blanks.

$ABCD$  is a trapezoid where  $\overline{AB} \parallel \overline{DC}$ .

35.  $m\angle A =$  \_\_\_\_\_

36.  $m\angle B =$  \_\_\_\_\_

37.  $m\angle C =$  \_\_\_\_\_

38.  $m\angle D =$  \_\_\_\_\_

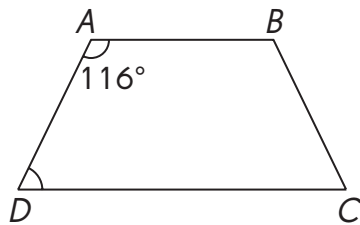
39.  $m\angle A + m\angle D = m\angle$  \_\_\_\_\_  $+ m\angle$  \_\_\_\_\_  $=$  \_\_\_\_\_



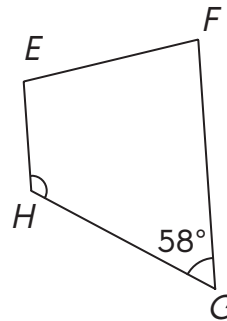
These trapezoids are not drawn to scale.

Find the unknown angle measures.

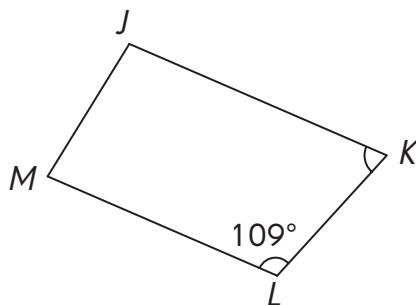
40.  $\overline{AB} \parallel \overline{DC}$



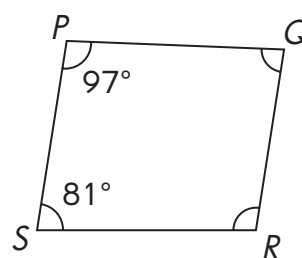
41.  $\overline{EH} \parallel \overline{FG}$



42.  $\overline{JK} \parallel \overline{ML}$

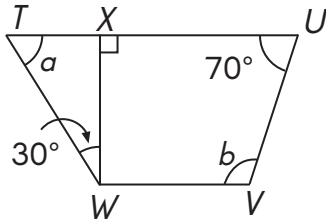


43.  $\overline{PS} \parallel \overline{QR}$

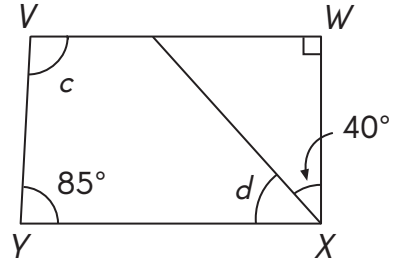


**These trapezoids are not drawn to scale.  
Find the unknown angle measures.**

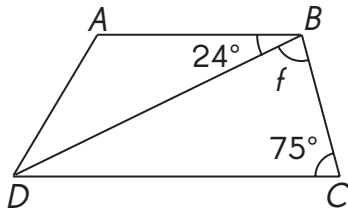
**44.**  $\overline{TU} \parallel \overline{WV}$



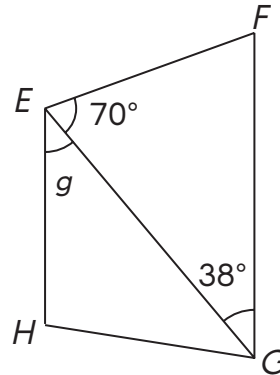
**45.**  $\overline{VW} \parallel \overline{YX}$



**46.**  $\overline{AB} \parallel \overline{DC}$



**47.**  $\overline{EH} \parallel \overline{FG}$



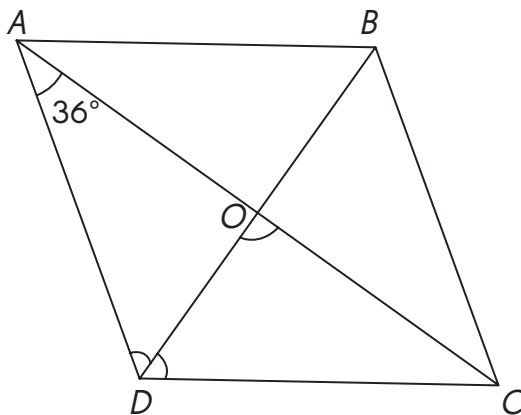


# Put On Your Thinking Cap!



## Challenging Practice

This figure is a rhombus and  $\angle ADO = \angle CDO$ . Find the measure of  $\angle DOC$ .



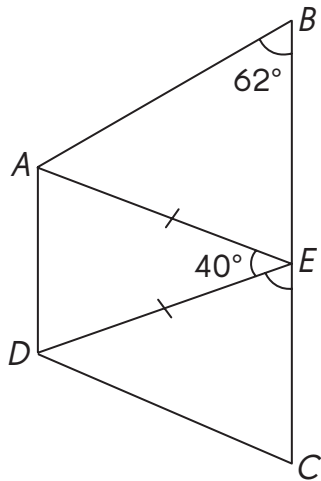


# Put On Your Thinking Cap!



## Problem Solving

1.  $ABCD$  is a trapezoid in which  $\overline{AD} \parallel \overline{BC}$ . Find the measure of  $\angle CED$ .



2.  $ABCD$  is a parallelogram and  $CDEF$  is a rhombus. Find the measure of  $\angle ADE$ .

