

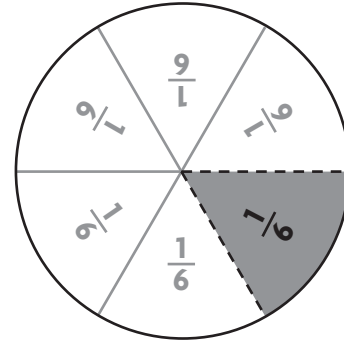
Name \_\_\_\_\_

## Angles and Fractional Parts of a Circle

Find how many  $\frac{1}{6}$  turns make a complete circle.

**Materials:** fraction circles

**Step 1** Place a  $\frac{1}{6}$  piece so the tip of the fraction piece is on the center of the circle. Trace the fraction piece by drawing along the dashed lines in the circle.



**Step 2** Shade and label the angle formed by the  $\frac{1}{6}$  piece.

**Step 3** Place the  $\frac{1}{6}$  piece on the shaded angle. Turn it clockwise (in the direction that the hands on a clock move). Turn the fraction piece to line up directly beside the shaded section.

**Step 4** Trace the fraction piece. Shade and label it. You have traced 2 sixths in all.

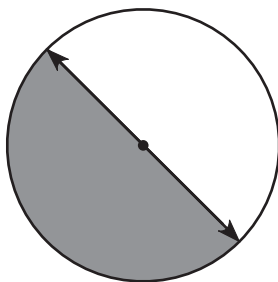
**Step 5** Repeat until you have shaded the entire circle.

There are six angles that come together in the center of the circle.

So, you need six  $\frac{1}{6}$  turns to make a circle.

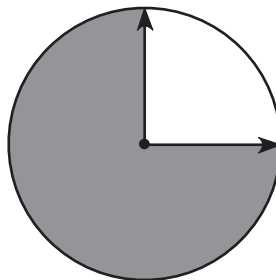
Tell what fraction of the circle the shaded angle represents.

1.



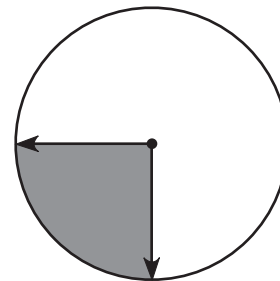
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2.



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3.



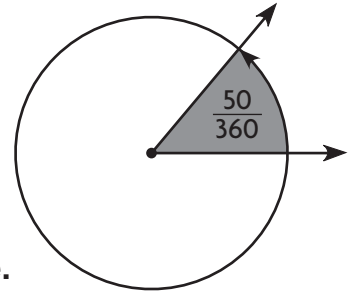
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# Degrees

Angles are measured in units called **degrees**. The symbol for degrees is  $^{\circ}$ . If a circle is divided into 360 equal parts, then an angle that turns through 1 part of the 360 measures  $1^{\circ}$ .

An angle that turns through  $\frac{50}{360}$  of a circle measures  $50^{\circ}$ .



**Find the measure of an angle that turns through  $\frac{1}{6}$  of a circle.**

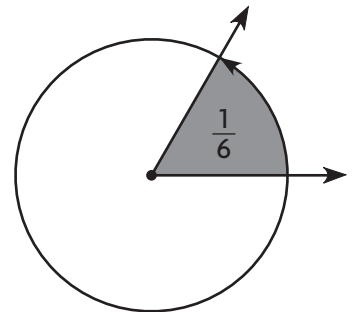
**Step 1** Find a fraction that is equivalent to  $\frac{1}{6}$  with 360 in the denominator. **Think:**  $6 \times 60 = 360$ .

$$\frac{1}{6} = \frac{1 \times 60}{6 \times 60} = \frac{60}{360}$$

**Step 2** Look at the numerator of  $\frac{60}{360}$ .

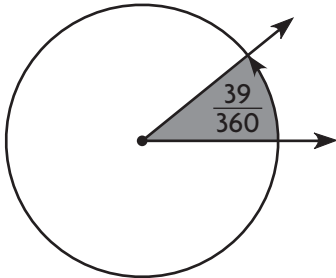
The numerator tells how many degrees are in  $\frac{1}{6}$  of a circle.

So, an angle that turns through  $\frac{1}{6}$  of a circle measures  $60^{\circ}$ .

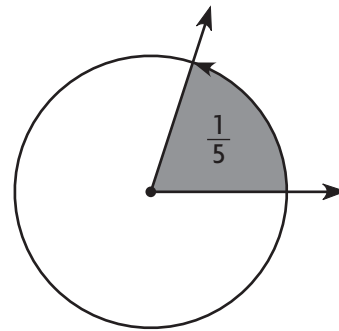


**Tell the measure of the angle in degrees.**

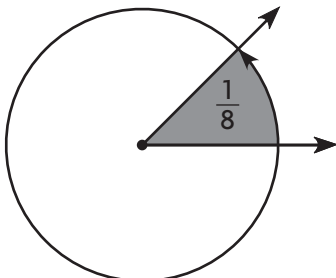
1.



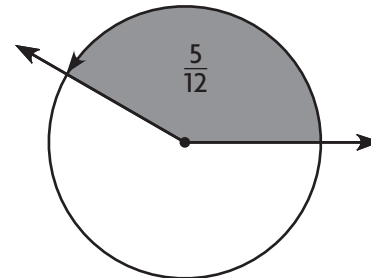
2.



3.



4.



Name \_\_\_\_\_

## Measure and Draw Angles

A **protractor** is a tool for measuring the size of an angle.

Follow the steps below to measure  $\angle ABC$ .

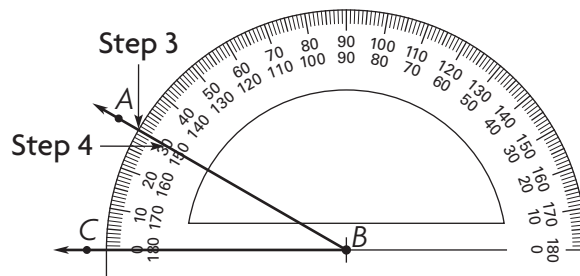
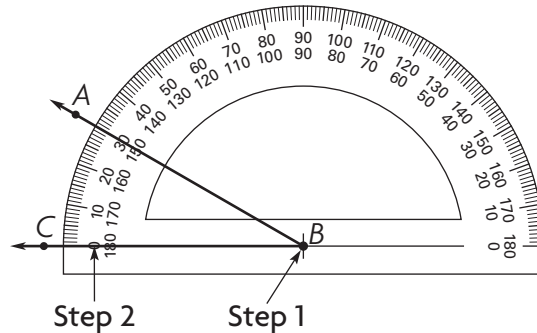
**Step 1** Place the center point of the protractor on vertex  $B$  of the angle.

**Step 2** Align the  $0^\circ$  mark on the protractor with ray  $BC$ . Note that the  $0^\circ$  mark is on the outer scale or top scale.

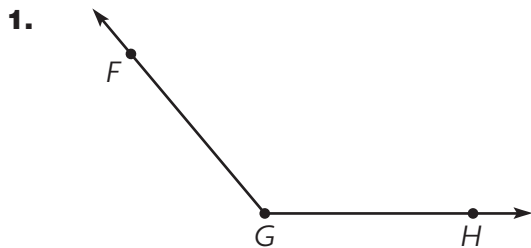
**Step 3** Find where ray  $BA$  intersects the same scale.

**Step 4** Read the angle measure on the scale.

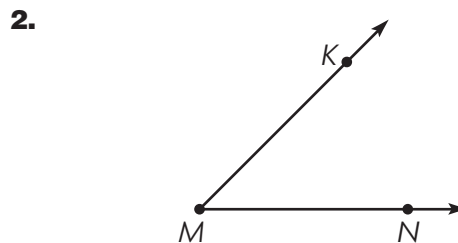
The  $m\angle ABC = \underline{30^\circ}$ .



Use a protractor to find the angle measure.



$m\angle FGH$  \_\_\_\_\_



$m\angle KMN$  \_\_\_\_\_

Use a protractor to draw the angle.

3.  $110^\circ$

4.  $55^\circ$

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## Join and Separate Angles

The measure of an angle equals the sum of the measures of its parts.

**Use your protractor and the angles at the right.**

**Step 1** Measure  $\angle ABC$  and  $\angle CBD$ . Record the measures.

$$m\angle ABC = \underline{35^\circ}; m\angle CBD = \underline{40^\circ}$$

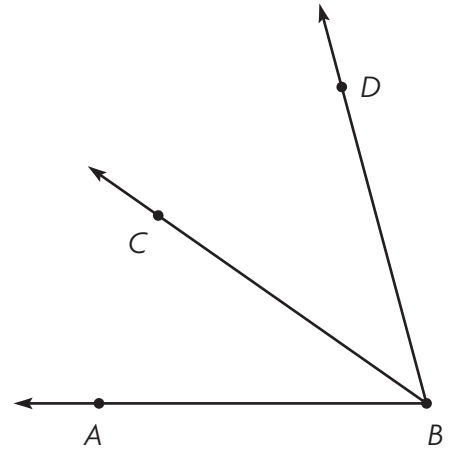
**Step 2** Find the sum of the measures.

$$\underline{35^\circ} + \underline{40^\circ} = \underline{75^\circ}$$

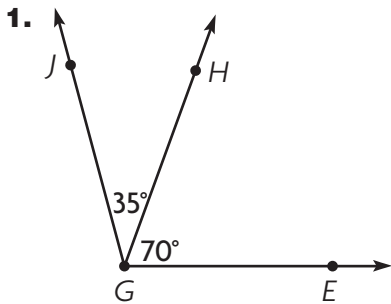
**Step 3** Measure  $\angle ABD$ . Record the measure.

$$m\angle ABD = \underline{75^\circ}$$

So,  $m\angle ABC + m\angle CBD = m\angle ABD$ .

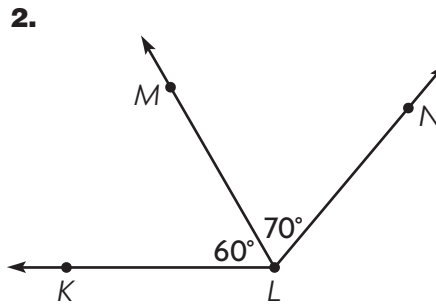


**Add to find the measure of the angle. Write an equation to record your work.**



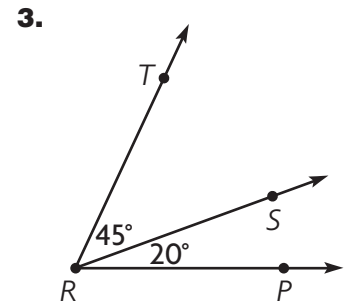
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$$m\angle EGJ = \underline{\hspace{2cm}}$$



\_\_\_\_\_

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



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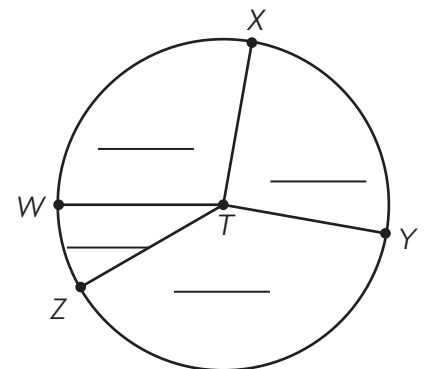
$$m\angle PRT = \underline{\hspace{2cm}}$$

**Use a protractor and the art at the right.**

**4.** Find the measure of each angle. Label each angle with its measure.

**5.** Write the sum of the angle measures as an equation.

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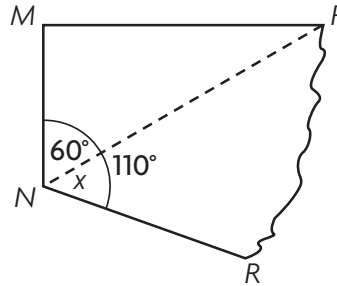


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## Problem Solving • Unknown Angle Measures

Use the strategy *draw a diagram*.

Mrs. Allen is cutting a piece of wood for a set for the school play. She needs a piece of wood with a  $60^\circ$  angle. After the cut, what is the angle measure of the part left over?



### Read the Problem

**What do I need to find?**

I need to find the angle measure of the part left over, or  $m\angle PNR$ .

**What information do I need to use?**

I can use the angle measures I know:  
 $m\angle MNP = 60^\circ$  and  
 $m\angle MNR = 110^\circ$ .

**How will I use the information?**

I can draw a bar model to find the unknown angle measure, or  $m\angle PNR$ .

### Solve the Problem

I can draw a bar model to represent the problem.

Then I can write an equation to solve the problem.

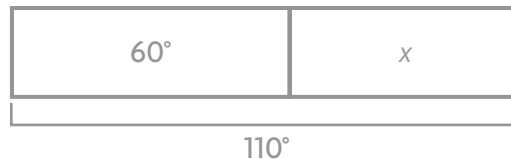
$$m\angle MNP + m\angle PNR = m\angle MNR$$

$$\underline{60^\circ} + x = \underline{110^\circ}$$

$$x = \underline{110^\circ} - \underline{60^\circ}, \text{ or } \underline{50^\circ}$$

So,  $m\angle PNR = \underline{50^\circ}$

The angle measure of the part left over is  $50^\circ$ .



- Cal is cutting a rectangular board as shown. What is the angle measure of the part left over? \_\_\_\_\_
- What equation did you use to solve?  
\_\_\_\_\_

