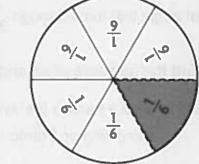# Angles and Fractional Parts of a Circle

**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
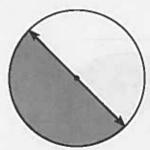the dashed lines in the circle.

**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.

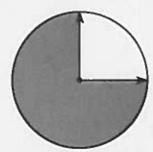There are __six__ angles that come together in the center
of the circle.

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

**Tell what fraction of the circle the shaded angle represents.**
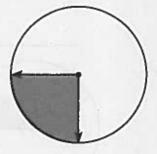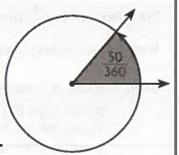
1.

2.

3.

_____          _____          _____

# Degrees

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

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

**Find the measure of an angle that turns through $\frac{1}{6}$ of a circle.**
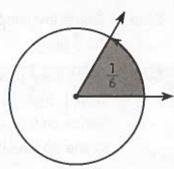
**Step 1** Find a fraction that is equivalent to $\frac{1}{6}$ with 360 in the denominator. **Think:** $6 \times 60 = 360$.

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

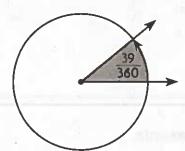**Step 2** Look at the numerator of $\frac{60}{360}$.

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

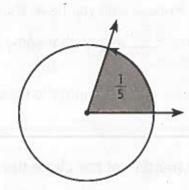So, an angle that turns through $\frac{1}{6}$ of a circle measures __60°__.

**Tell the measure of the angle in degrees.**
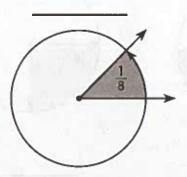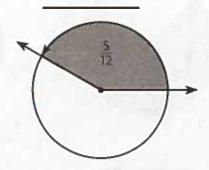
1.

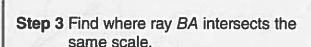_____

2.

_____

3.

_____

4.

_____

# Measure and Draw Angles

A **protractor** is a tool for measuring the size of an angle.
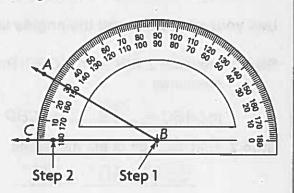
**Follow the steps below to measure ∠ABC.**

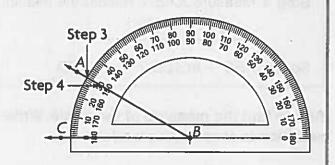**Step 1** Place the center point of the protractor on vertex B of the angle.

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

**Step 3** Find where ray BA intersects the same scale.
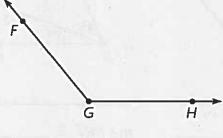
**Step 4** Read the angle measure on the scale.

The m∠ABC = **30°**.

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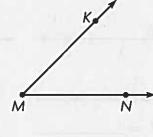
**Use a protractor to find the angle measure.**

**1.**

m∠FGH _____

**2.**

m∠KMN _____

**Use a protractor to draw the angle.**

**3.** 110°

**4.** 55°

Name _____

# 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 ∠ABC and ∠CBD. Record the
measures.

m∠ABC = __35°__; m∠CBD = __40°__
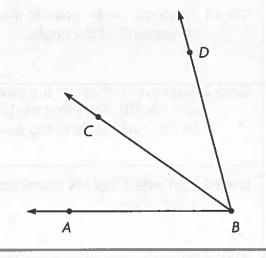
**Step 2** Find the sum of the measures.

__35°__ + __40°__ = __75°__
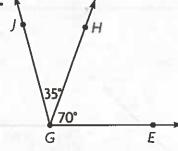
**Step 3** Measure ∠ABD. Record the measure.
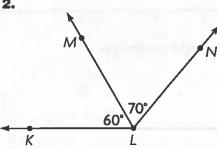
m∠ABD = __75°__
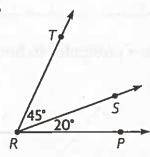
So, m∠ABC + m∠CBD = m∠ABD.

---

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

**1.**

35°
70°
J   H
G   E

**2.**

M   N
70°
60°
K   L

**3.**

T
45°  20°
S
R   P

_____    _____    _____
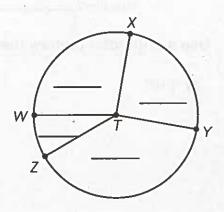
m∠EGJ = _____    m∠KLN = _____    m∠PRT = _____

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

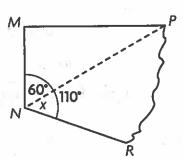**4.** Find the measure of each angle. Label each angle
with its measure.

_____    _____

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

X
W         T         Y
Z

_____    _____

_____

# 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° angle. After the cut, what is the angle measure of the part left over?

| Read the Problem | | |
|---|---|---|
| **What do I need to find?**<br><br>I need to find __the angle__ __measure of the part left__ __over, or m∠PNR__ | **What information do I need to use?**<br><br>I can use __the angle__ __measures I know:__<br>__m∠MNP = 60° and__<br>__m∠MNR = 110°__ | **How will I use the information?**<br><br>I can __draw a bar model to__ __find the unknown angle__ __measure, or m∠PNR__ |

**Solve the Problem**

I can __draw a bar model to represent the problem__.

Then I can __write an equation to solve the problem__.

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

__60°__ $+ x =$ __110°__

$x =$ __110°__ $-$ __60°__, or __50°__
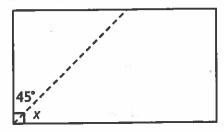
So, $m\angle PNR =$ __50°__

The angle measure of the part left over is __50°__.

1. Cal is cutting a rectangular board as shown. What is the angle measure of the part left over? _____

2. What equation did you use to solve?

_____

45°
x