

**Prerequisite: What does it mean to multiply with fractions?**



**Study the example problem showing multiplication with a fraction. Then solve problems 1–6.**

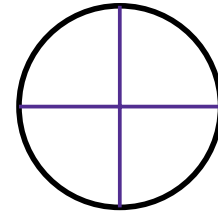
### Example

4 friends shared a whole pizza. Each person ate an equal amount.

Draw lines on the circle at the right to show the fraction of the pizza that each person ate.

Use multiplication to show that the four parts together equal the whole.

$$4 \times \frac{1}{4} = \frac{4}{1} \times \frac{1}{4} = \frac{4}{4} = 1 \text{ whole}$$



The pizza is divided into 4 parts.  
Each part is  $\frac{1}{4}$  of the pizza.

- 1** 8 friends shared a pizza. Each person ate an equal amount. Draw lines on the circle at the right to show the fraction of the pizza that each person ate.

a. What fraction of the pizza did each person eat?

\_\_\_\_\_

b. Use multiplication to show that all the parts are equal to the whole.

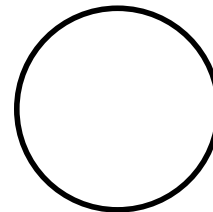
\_\_\_\_\_

- 2** A pizza is cut into 8 equal slices.

a. What fraction of the pizza is each slice? \_\_\_\_\_

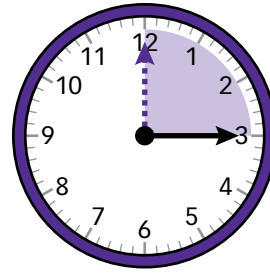
b. Mandy eats 2 slices. What fraction of the pizza did Mandy eat? \_\_\_\_\_

c. Use multiplication to explain how you found the answer to **b**. \_\_\_\_\_



**Solve.**

**3** Look at the clock at the right. When the minute hand moves from the 12 to the 3, it moves over  $\frac{1}{4}$  of a circle.



- a. How many minutes are in 1 hour? \_\_\_\_\_
- b. When the minute hand moves from the 12 to the 3, how many minutes have passed? Use fraction multiplication to show your answer.

$\frac{1}{4} \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$  minutes

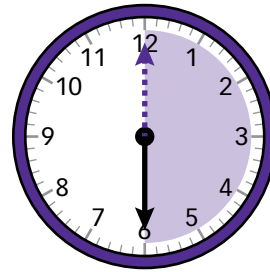
**4** Look at the clock at the right.

- a. When the minute hand moves from the 12 to the 6, what fraction of a circle does it move over?

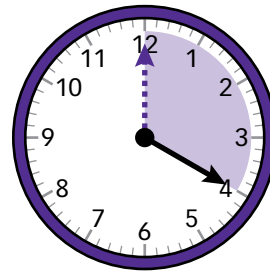
\_\_\_\_\_ of a circle

- b. How many minutes have passed? Use fraction multiplication to show your answer.

\_\_\_\_\_

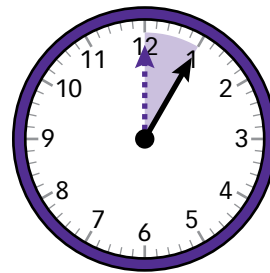


**5** Look at the clock at the right. When the minute hand moves from the 12 to the 4, it moves over  $\frac{1}{3}$  of a circle. How many minutes have passed? Use fraction multiplication to show your answer.



\_\_\_\_\_

**6** Look at the clock at the right. When the minute hand moves from the 12 to the 1, how many minutes have passed? Use fraction multiplication to show your answer.



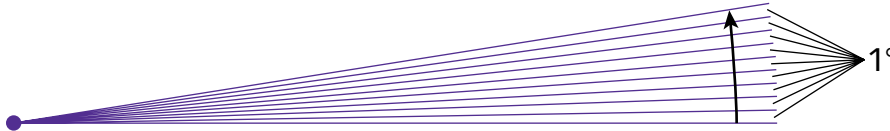
\_\_\_\_\_

## Show Measures of Angles

**Study the example showing the measure of an angle.**  
**Then solve problems 1–6.**

### Example

The drawing below shows an angle that turns through 9 one-degree angles.



How many degrees does the angle measure?

The angle measures  $9^\circ$  because it turns through 9 one-degree angles.

The measure of any angle is equal to the number of one-degree angles it turns through.

- 1 An angle turns through 60 one-degree angles. What is the measure of the angle? \_\_\_\_\_ degrees
- 2 An angle turns through 160 one-degree angles. What is the measure of the angle? \_\_\_\_\_ degrees
- 3 The circle at the right has 4 equal parts. The angle shown in the circle is a right angle.

a. What fraction of the circle does the right angle turn through? \_\_\_\_\_ of the circle

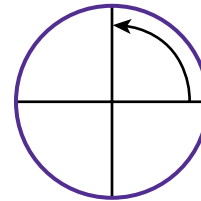
b. Complete the sentence.

A circle has  $360^\circ$ . A right angle turns through

of a circle, or  of \_\_\_\_\_ degrees.

c. Use fraction multiplication to show how you can find the measure of a right angle.

\_\_\_\_\_



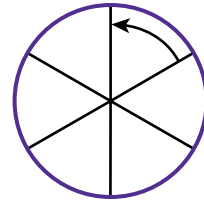
### Vocabulary

**angle** a geometric shape made by two rays that meet at a common endpoint, called a vertex.

**right angle** an angle that looks like a square corner and measures  $90^\circ$ .

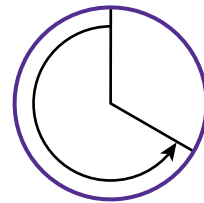
## Solve.

- 4 The circle at the right has 6 equal parts. The angle shown in the circle is an acute angle.



- a. What fraction of the circle does the acute angle turn through? \_\_\_\_\_ of the circle
- b. Complete the sentence.  
A circle has  $360^\circ$ . The acute angle turns through  $\frac{\square}{\square}$  of the circle, or  $\frac{\square}{\square}$  of \_\_\_\_\_ degrees.
- c. Use fraction multiplication to show how you can find the measure of the acute angle.
- \_\_\_\_\_

- 5 The larger part of the circle at the right is twice as big as the smaller part.



- a. What fraction of the circle is the smaller part?  $\frac{\square}{3}$
- b. What fraction of the circle is the larger part?  $\frac{\square}{3}$
- c. What fraction of the circle does the angle shown by the arrow turn through?  $\frac{\square}{3}$  of the circle
- d. Complete the sentence.

A circle has  $360^\circ$ . The angle shown by the arrow turns through  $\frac{\square}{\square}$  of the circle, or  $\frac{\square}{\square}$  of \_\_\_\_\_ degrees.

- e. Use fraction multiplication to show how you can find the measure of the angle shown by the arrow.
- \_\_\_\_\_

- 6 What is the measure of an angle that turns through  $\frac{1}{12}$  of a circle?
- \_\_\_\_\_

### Vocabulary

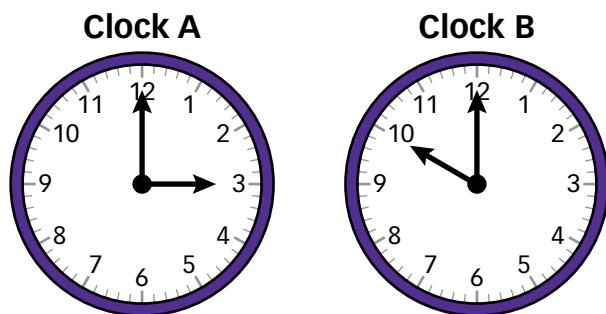
**acute angle** an angle that has fewer degrees than a right angle.

## Reason and Write

**Study the example. Underline two parts that you think make it a particularly good answer and a helpful example.**

**Example**

Describe and compare the angles shown by the hands on the clocks below. What kinds of angle are shown? Which angle has a greater measure?



**Show your work.** Use numbers and words to explain your answer.

**The angle formed by the hands of Clock A turns through 15 minutes out of 60 minutes on the clock.**

**This is  $\frac{15}{60}$ , or  $\frac{1}{4}$ , of the circle on the clock.**

**$\frac{1}{4}$  of 360 degrees in a circle is the measure of the angle.**

$$\frac{1}{4} \times 360 = 90$$

**The angle measures 90 degrees, so it is a right angle.**

**The angle formed by the hands of Clock B turns through 10 minutes out of 60 minutes.**

**This is  $\frac{10}{60}$ , or  $\frac{1}{6}$ , of the circle.**

**$\frac{1}{6}$  of 360 degrees in a circle is the measure of the angle.**

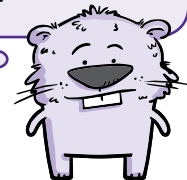
$$\frac{1}{6} \times 360 = 60$$

**The angle measures 60 degrees, so it is an acute angle.**

**The angle in Clock A has a greater measure than the angle in Clock B because 90 degrees > 60 degrees.**

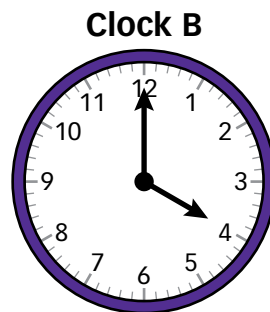
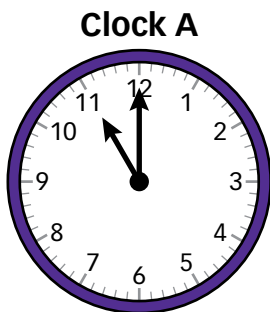
Where does the example ...

- describe each angle?
- compare the measures of the angles?
- use numbers to explain?
- use words to explain?



**Solve the problem. Use what you learned from the model.**

Describe and compare the angles shown by the hands on the clocks below. What kinds of angle are shown? Which angle has a greater measure?



**Show your work.** Use numbers and words to explain your answer.

Did you ...

- describe each angle?
- compare the measures of the angles?
- use numbers to explain?
- use words to explain?

