

Name _____

Angles and Fractional Parts of a Circle**Essential Question** How can you relate angles and fractional parts of a circle?

Measurement and Data—4.MD.C.5a

MATHEMATICAL PRACTICES
MP2, MP3, MP5**Investigate****Materials** ■ fraction circles

- A.**
- Place a
- $\frac{1}{12}$
- piece on the circle. Place the tip of the fraction piece on the center of the circle. Trace the fraction piece to create an angle.

What parts of the fraction piece represent the rays

of the angle? _____

Where is the vertex of the angle?

- B.**
- Shade the angle formed by the
- $\frac{1}{12}$
- piece. Label it
- $\frac{1}{12}$
- .

- C.**
- Place the
- $\frac{1}{12}$
- piece back on the shaded angle. Turn it counterclockwise.

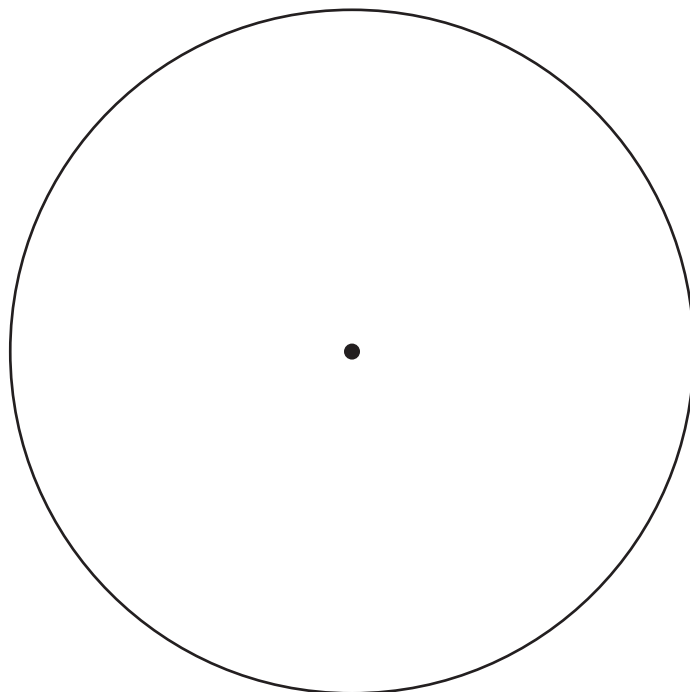
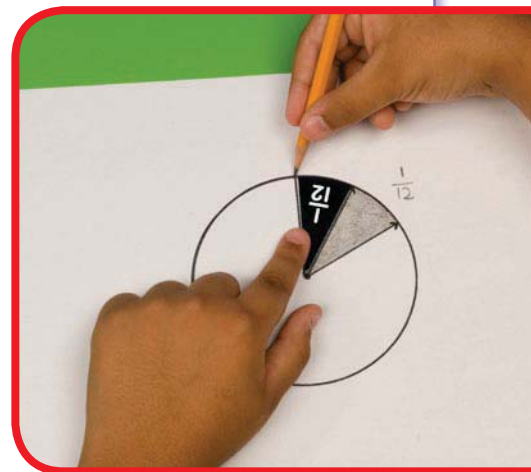
Counterclockwise is the direction opposite from the way the hands move on a clock.Trace the fraction piece in its new position. How many twelfths have you traced in all? _____ Label $\frac{2}{12}$.

- D.**
- Turn the fraction piece counterclockwise again and trace it. Label the total number of twelfths.

Continue until you reach the shaded angle.

How many times did you need to turn the $\frac{1}{12}$ piece to make a circle? _____

How many angles come together in the center of the circle? _____



Draw Conclusions

1. Compare the size of the angle formed by a $\frac{1}{4}$ piece and the size of the angle formed by a $\frac{1}{12}$ piece. Use a $\frac{1}{4}$ piece and your model on page 441 to help.

2. Describe the relationship between the size of the fraction piece and the number of turns it takes to make a circle.

Make Connections

You can relate fractions and angles to the hands of a clock.

Let the hands of the clock represent the rays of an angle. Each 5-minute mark represents a $\frac{1}{12}$ turn **clockwise**.



15 minutes elapse.

The minute hand makes a

_____ turn clockwise.



30 minutes elapse.

The minute hand makes a

_____ turn clockwise.



45 minutes elapse.

The minute hand makes a

_____ turn clockwise.



60 minutes elapse.

The minute hand makes a

_____ turn clockwise.

**Math
Talk**

MATHEMATICAL PRACTICES 3

Compare Representations

How is an angle formed in a circle using a $\frac{1}{4}$ fraction piece like a $\frac{1}{4}$ turn and 15 minutes elapsing on a clock?

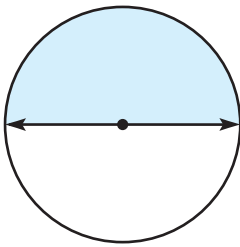
Name _____

Share and Show

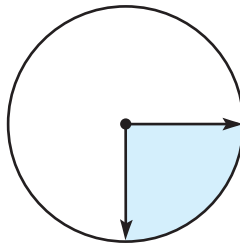


Tell what fraction of the circle the shaded angle represents.

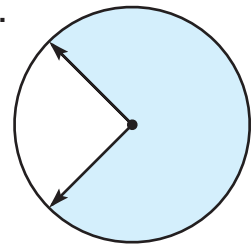
1.



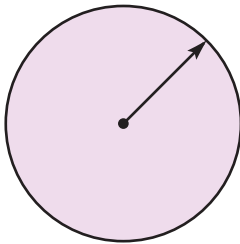
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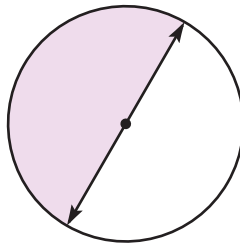
3.



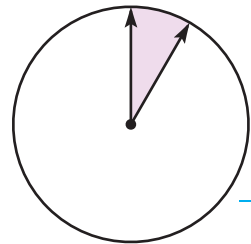
4.



5.

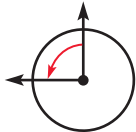


6.



Tell whether the angle on the circle shows a $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, or 1 full turn clockwise or counterclockwise.

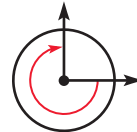
7.



8.



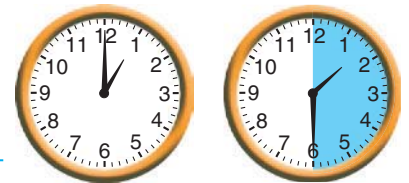
9.



Problem Solving • Applications



10. **MATHEMATICAL PRACTICE 1** Susan watched the game from 1 P.M. to 1:30 P.M. **Describe** the turn the minute hand made.

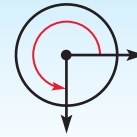


11. **GO DEEPER** Compare the angles in Exercises 1 and 5. Does the position of the angle affect the size of the angle? Explain.

Personal Math Trainer



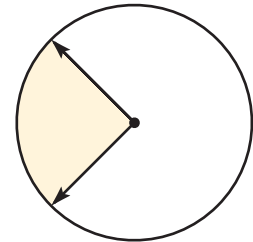
12. **THINK SMARTER +** Malcolm drew this angle on the circle.
Which of the following describes the angle? Mark all that apply.



- $\frac{3}{4}$ turn
- clockwise
- $\frac{1}{4}$ turn
- counterclockwise

Sense or Nonsense?

13. **THINK SMARTER** Whose statement makes sense? Whose statement is nonsense? Explain your reasoning.



The shaded angle represents $\frac{1}{4}$ of the circle.

The shaded angle represents $\frac{3}{8}$ of the circle.



Carla's Statement

Adam's Statement

- For the statement that is nonsense, write a statement that makes sense.

- What is another way to describe the size of the angle? Explain.

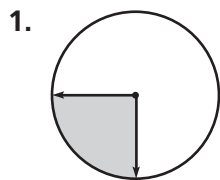
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Angles and Fractional Parts of a Circle

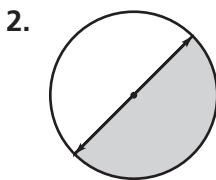


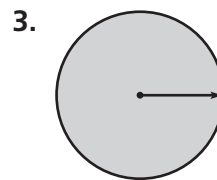
COMMON CORE STANDARD—4.MD.C.5a
Geometric measurement: understand concepts of angle and measure angles.

Tell what fraction of the circle the shaded angle represents.

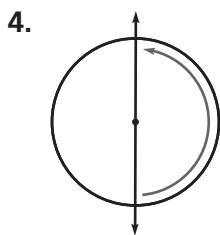


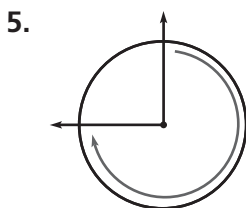
$\frac{1}{4}$

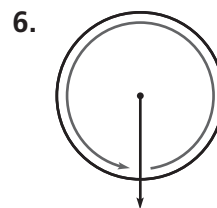




Tell whether the angle on the circle shows a $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, or 1 full turn clockwise or counterclockwise.







Problem Solving



7. Shelley exercised for 15 minutes. Describe the turn the minute hand made.



Start

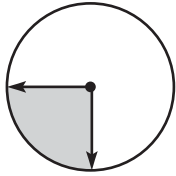


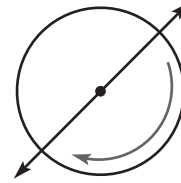
End

8. **WRITE** *Math* Give a description of a $\frac{3}{4}$ -turn of the minute hand on a clock face.

Lesson Check (4.MD.C.5a)

1. What fraction of the circle does the shaded angle represent?
2. Describe the turn shown below.





Spiral Review (4.OA.B.4, 4.NF.A.1, 4.NF.B.4c, 4.NF.C.7)

3. Write $\frac{2}{3}$ and $\frac{3}{4}$ as a pair of fractions with a common denominator.

4. Raymond bought $\frac{3}{4}$ of a dozen rolls. How many rolls did he buy?

5. List all the factors of 18.

6. Jonathan rode 1.05 miles on Friday, 1.5 miles on Saturday, 1.25 miles on Monday, and 1.1 miles on Tuesday. On which day did he ride the shortest distance?
