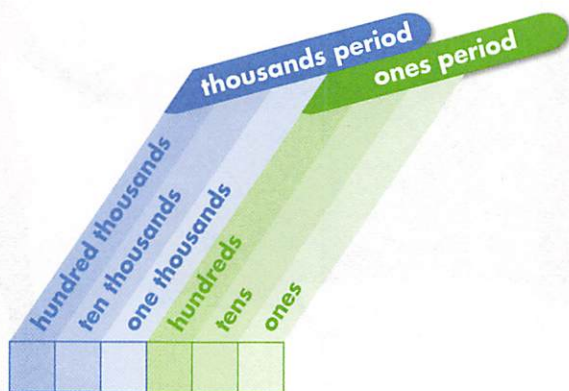


Name _____



Solve & Share

What is the relationship between the value of the first 5 and the value of the second 5 in 5,500? *Solve this problem any way you choose.*



Step Up to Grade 4

Lesson 1

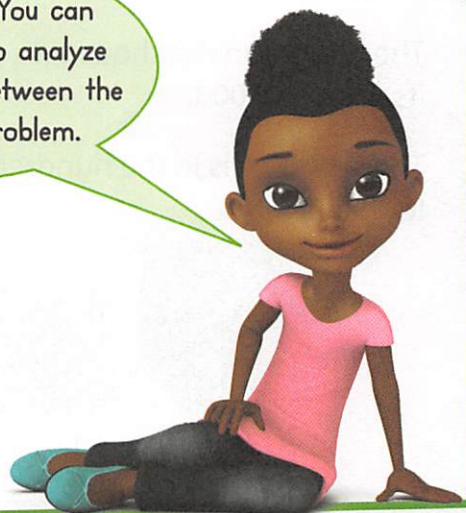
Place Value Relationships

I can ...

recognize that a digit in one place has ten times the value of the same digit in the place to its right.

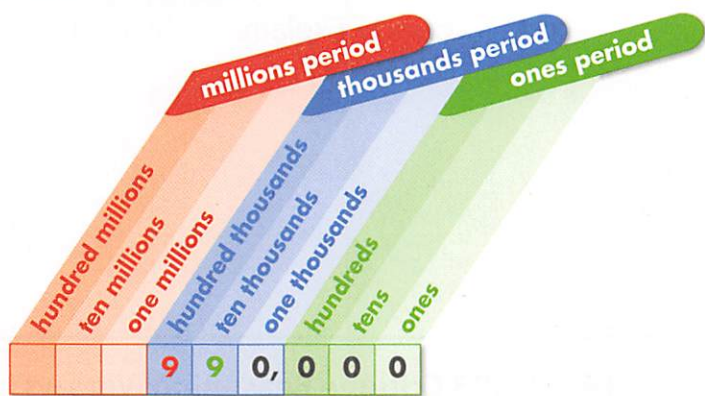
© Content Standards 4.NBT.A.1, 4.NBT.A.2
Mathematical Practices MP.2, MP.3, MP.8

Use **reasoning**. You can use place value to analyze the relationship between the digits in the problem.



Look Back! © MP.2 Reasoning Describe two ways 5,000 and 500 are related.

Another Example!



The first 9 is in the hundred-thousands place. Its value is 900,000.

The second 9 is in the ten-thousands place. Its value is 90,000.

The value of the first 9 is ten times as great as the value of the second 9.

☆ Guided Practice



Do You Understand?

- MP.2 Reasoning** Is the value of the first 7 ten times as great as the value of the second 7 in 7,027? Explain.
- MP.3 Construct Arguments** Is the value of the 8 in 87,503 ten times as great as the value of the 7? Explain.

Do You Know How?

For 3 and 4, name the values of the given digits in each number. What is the relationship between the values of the given digits?

- the 5s in 5,500
- the 2s in 220,400

☆ Independent Practice ☆

For 5–12, name the values of the given digits in each number.

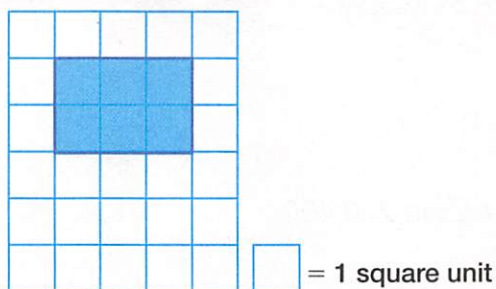
- the 8s in 1,884
- the 4s in 44,391
- the 9s in 79,951
- the 2s in 220,000
- the 5s in 45,035
- the 4s in 4,448
- the 2s in 20,723
- the 7s in 378,708

Math Practices and Problem Solving

13. © **MP.3 Construct Arguments** What can you say about the 9s in 59,992?
14. © **MP.3 Critique Reasoning** Mia says in 2,222, all the digits have the same value. Is Mia correct? Explain.

15. **Number Sense** The Mississippi River flooded in 1927. In the number 1927, is the value of the 9 in the hundreds place ten times the value of the 2 in the tens place? Explain.
16. © **MP.3 Critique Reasoning** Vin says in 2,616, one 6 is 10 times as great as the other 6. Is he correct? Explain.

17. Describe 2 ways to find the area of the shaded rectangle.



18. **Higher Order Thinking** In 881,588, how is the relationship between the first pair of 8s the same as the relationship between the second pair of 8s?

© Common Core Assessment

19. Which group of numbers shows the values of the 7s in 57,707?
- (A) 70,000; 7,000; 700
 - (B) 70,000; 700; 70
 - (C) 7,000; 700; 7
 - (D) 700; 70; 7
20. In which number is the value of the red digit ten times as great as the value of the green digit?
- (A) 886,628
 - (B) 886,628
 - (C) 886,628
 - (D) 886,628

Name _____



Solve & Share

Find the products for 3×4 , 3×40 , 3×400 , and $3 \times 4,000$. *Solve these problems using any strategy you choose.*

Step Up to Grade 4

Lesson 2

Mental Math: Multiply by Multiples of 10, 100, and 1,000

I can ...

find the products of multiples of 10, 100, and 1,000 using mental math and place-value strategies.

© Content Standard 4.NBT.B.5
Mathematical Practices MP.2, MP.4, MP.7

You can look for **relationships** in the products. How can finding the first product help you find the remaining products? *Show your work in the space above!*



Look Back! © **MP.7 Look for Relationships** What pattern do you notice in the products?

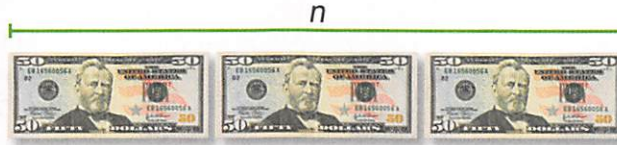
Essential Question

How Can You Multiply by Multiples of 10, 100, and 1,000?



A Calculate 3×50 , 3×500 , and $3 \times 5,000$ using basic multiplication facts and properties of operations. Then, calculate 6×50 , 6×500 , and $6 \times 5,000$.

The **Associative Property of Multiplication** states that you can change the grouping of the factors and the product stays the same.



B Find 3×50 , 3×500 , and $3 \times 5,000$.

$$\begin{aligned} 3 \times 50 &= 3 \times (5 \times 10) \\ &= (3 \times 5) \times 10 \\ &= 15 \times 10 \\ &= 150 \end{aligned}$$

Shortcut rule for 3×50 :
Multiply 3×5 and write **1 zero**.
So, $3 \times 50 = 150$

Shortcut rule for 3×500 :
Multiply 3×5 and write **2 zeros**.
 $3 \times 500 = 1,500$

Shortcut rule for $3 \times 5,000$:
Multiply 3×5 and write **3 zeros**.
 $3 \times 5,000 = 15,000$

C Find 6×50 , 6×500 , and $6 \times 5,000$.

Apply the shortcut rules:

$$\begin{aligned} 6 \times 5 &= 30 \\ 6 \times 50 &= 300 \\ 6 \times 500 &= 3,000 \\ 6 \times 5,000 &= 30,000 \end{aligned}$$

When the product of a basic fact ends in zero, the product will have an extra zero. The **extra zero** is part of the basic fact that you use.

Convince Me! © **MP.2 Reasoning** How many zeros will be in the product of 5×200 ? Explain.

Another Example!

Use place value to calculate 5×50 , 5×500 , and $5 \times 5,000$.

5×50 is 5 groups of 5 tens or 5×5 tens. 5×5 tens is 25 tens, or 250.

5×500 is 5 groups of 5 hundreds or 5×5 hundreds. 5×5 hundreds is 25 hundreds, or 2,500.

$5 \times 5,000$ is 5 groups of 5 thousands or 5×5 thousands. 5×5 thousands is 25 thousands, or 25,000.

☆ Guided Practice

Do You Understand?

- MP.7 Look for Relationships**
 Show how you can use the basic fact $4 \times 5 = 20$ to determine the product of 4×500 .
- Bob said $5 \times 800 = 400$. Explain his error.

Do You Know How?

For 3–5, use strategies you learned to help multiply.

- $7 \times 3 = \underline{\hspace{2cm}}$
 $7 \times 30 = \underline{\hspace{2cm}}$
 $7 \times 300 = \underline{\hspace{2cm}}$
 $7 \times 3,000 = \underline{\hspace{2cm}}$
- 6×60
- 6×300

☆ Independent Practice ☆

Leveled Practice For 6–11, find each product.

- | | | |
|---|---|---|
| 6. $9 \times 40 = \underline{\hspace{2cm}}$ | 7. $2 \times 90 = \underline{\hspace{2cm}}$ | 8. $7 \times 80 = \underline{\hspace{2cm}}$ |
| $9 \times 400 = \underline{\hspace{2cm}}$ | $2 \times 900 = \underline{\hspace{2cm}}$ | $7 \times 800 = \underline{\hspace{2cm}}$ |
| $9 \times 4,000 = \underline{\hspace{2cm}}$ | $2 \times 9,000 = \underline{\hspace{2cm}}$ | $7 \times 8,000 = \underline{\hspace{2cm}}$ |
| 9. $3 \times 3,000$ | 10. 800×6 | 11. 2×70 |

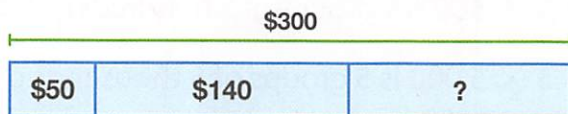
You can use place-value strategies to calculate each product.



Math Practices and Problem Solving

12. **Math and Science** The Amazon River is about 5 times the length of the Rhine River. If the Rhine River is about 800 miles long, about many miles long is the Amazon River? Write and solve an equation.

13. **MP.4 Model with Math** Sophia, Emma, and Jacob are trying to raise \$300 for a local shelter. Sophia raised \$50. Emma raised \$140. How much money does Jacob need to raise in order to reach their goal?



For 14 and 15, use the table at the right.

14. There are 7 boys and 2 adults in Ethan's scout troop. How much did the troop pay for tickets to the amusement park?

15. **Higher Order Thinking** Mason visited Happyland with her dad and a friend. They bought tickets for Plan C. How much money did they save on the two children's tickets for Plan C instead of buying separate tickets for Plan A and Plan B?



DATA	Happyland Ticket Prices		
	Plans	Adult	Child
	Plan A Waterpark	\$50	\$40
	Plan B Amusement Park	\$40	\$30
	Plan C Combined A + B	\$80	\$60

Common Core Assessment

16. Isabella says 7×900 is greater than $9 \times 7,000$.
Noah says 7×900 is less than $9 \times 7,000$.

Part A

Without calculating the answer, explain how to use place-value strategies or the Associative Property to find which is greater.

Part B

Without calculating the answer, explain how to use relationships or basic facts to find which is less.

Name _____



Solve & Share

The principal of a school needs to order supplies for 20 new classrooms. Each classroom needs the following items: 20 desks, 30 chairs, and 40 pencils. How many of each item does the principal need to order? *Solve these problems using any strategy you choose.*

You can **use structure**. What basic facts can you use to help solve these problems? How are they related? *Show your work in the space below!*



Step Up to Grade 4

Lesson 3

Mental Math: Multiply Multiples of 10

I can ...

use place-value strategies or patterns to multiply by multiples of 10.

© Content Standards 4.NBT.B.5, 4.OA.A.3
Mathematical Practices MP.2, MP.7

Look Back! © **MP.7 Look for Relationships** Look at the factors and products. What patterns do you notice?

Another Example!

Find 30×80 . The product has the same number of zeros as in both factors.

$$\begin{aligned} 30 \times 80 &= 3 \times 10 \times 8 \times 10 \\ &= (3 \times 8) \times (10 \times 10) \\ &= 24 \times 100 \\ &= 2,400 \end{aligned}$$

You can use the Commutative and Associative Properties of Multiplication to see why the patterns with zeros work!



★ Guided Practice

Do You Understand?

1. **MP.2 Reasoning** Find 50×80 . How many zeros are in the product?
2. Fewer people go the park in September than March. There are 30 days in September. If 50 people visit the park each day in September, how many people visit for the whole month?

Do You Know How?

For 3–8, use basic facts and place-value strategies to find each product.

- | | |
|-------------------|-------------------|
| 3. 10×90 | 4. 40×10 |
| 5. 80×10 | 6. 50×90 |
| 7. 60×40 | 8. 70×70 |

★ Independent Practice

For 9–16, use basic facts and place-value strategies to find each product.

9. 10×50	10. 40×20	11. 70×30	12. 20×90
-------------------	--------------------	--------------------	--------------------

13. 40×80	14. 30×60	15. 30×20	16. 90×80
--------------------	--------------------	--------------------	--------------------

For 17–22, find the missing factor.

17. $10 \times \underline{\hspace{2cm}} = 100$	18. $\underline{\hspace{2cm}} \times 20 = 1,400$	19. $\underline{\hspace{2cm}} \times 70 = 3,500$
20. $30 \times \underline{\hspace{2cm}} = 1,500$	21. $\underline{\hspace{2cm}} \times 80 = 5,600$	22. $50 \times \underline{\hspace{2cm}} = 3,000$

Math Practices and Problem Solving

23. **MP.2 Reasoning** The product of two factors is 3,200. If one of the factors is 40, what is the other factor? Explain.
24. **Algebra** There are 30 players on each high school football team. Explain how you can find the total number of players if there are 10 teams. Write and solve an equation.

25. Alan leaves the water running while brushing his teeth. He uses 2 gallons of water. He then uses 10 gallons of water to wash clothes. How many more quarts of water did Alan use while washing his clothes than brushing his teeth?



26. **MP.7 Look for Relationships** Emily walked 60 minutes each day for 80 days. Show how you can use basic facts to find how many minutes Emily walked.
27. **Higher Order Thinking** Explain why the product of 50 and 20 has three zeros when 50 and 20 each have one zero.

Common Core Assessment

28. Mr. Cantor travels 20 weeks a year for work. He is home the other 32 weeks. There are 7 days in 1 week. Which of the following expressions can Mr. Cantor use to mentally find the number of days he is home?
- (A) $(7 \times 2) + (3 \times 10)$
(B) 7×100
(C) $(7 \times 30) + (7 \times 10)$
(D) $(7 \times 30) + (7 \times 2)$
29. Mrs. Cantor travels 22 weeks a year for work. She is home the other 30 weeks. There are 7 days in a week. Which of the following basic facts can Mrs. Cantor use to help find the number of days she is home?
- (A) 2×7
(B) 3×7
(C) $22 + 7$
(D) $30 + 7$

Name _____



Solve

Solve & Share

There are 10 teams in a baseball league. Each team has 25 players. How many players are in the league? *Solve this problem using any strategy you choose.*

Step Up to Grade 4

Lesson 4

Use Models to Multiply 2-Digit Numbers by Multiples of 10

I can ...

use models and properties of operations to help multiply.

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Mathematical Practices MP.1, MP.2, MP.4, MP.5



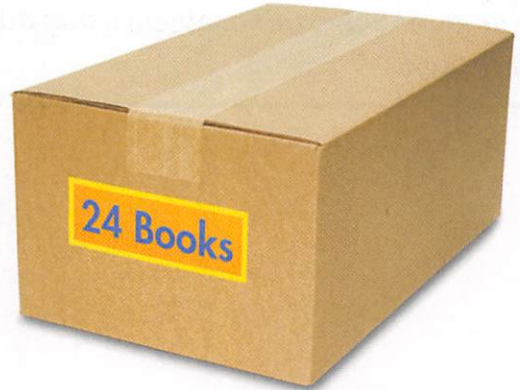
You can **use appropriate tools**. Place-value blocks or grid paper can help you visualize the problem. *Show your work in the space above!*

Look Back! © **MP.2 Reasoning** How do the digits in a number being multiplied by 10 compare to the digits in the product? Explain.

How Can You Use an Array or an Area Model to Multiply?

A

Max's Moving Company has boxes for packing books. If each box holds 24 books, how many books would fit into 20 boxes?



Making an array with place-value blocks or using an area model helps to visualize the partial products.

B Use place-value blocks to make an array.

Find $20 \times 24 = b$.



400

80

$$\begin{array}{r} 400 \\ + 80 \\ \hline 480 \end{array}$$

Partial Products

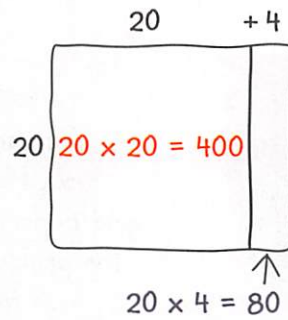
$$20 \times 24 = 480$$

$$b = 480$$

480 books will fit into 20 boxes.

C Draw an area model.

Find $20 \times 24 = b$.



$$\begin{array}{r} 400 \\ + 80 \\ \hline 480 \end{array}$$

Partial Products

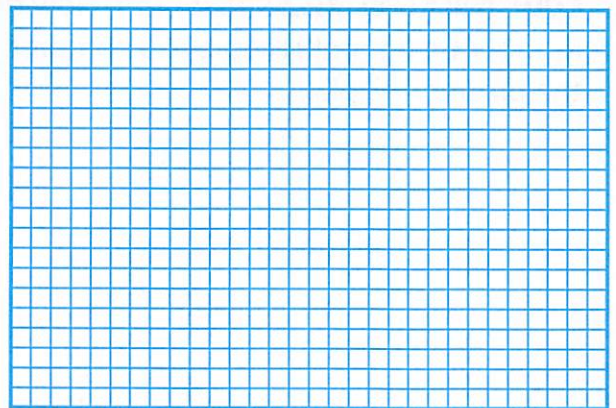
$$20 \times 24 = 480$$

$$b = 480$$

480 books will fit into 20 boxes.

Convince Me! © MP.4 Model with Math

Use the grid to show an array for 20×27 . What is the product?



Name _____

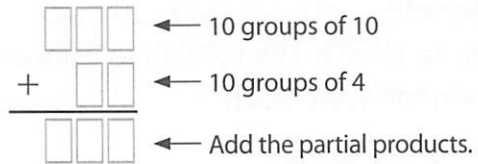
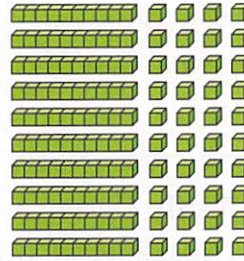
☆ Guided Practice

Do You Understand?

1. **MP.4 Model with Math** Draw an area model to show 20×22 . Then find the product.

Do You Know How?

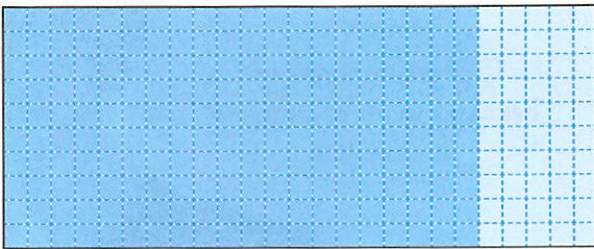
2. The place-value block array shows 10×14 . Find the product.



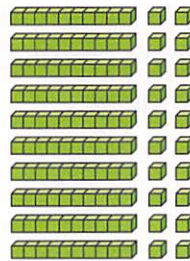
☆ Independent Practice ☆

For 3–12, use place-value blocks, area models, or arrays to find each product.

3. 10×25



4. 10×12



You can use a sheet of grid paper to draw arrays or area models.

5. 20×31

6. 20×46

7. 30×25

8. 40×34

9. 10×63

10. 50×16

11. 70×21

12. 80×46

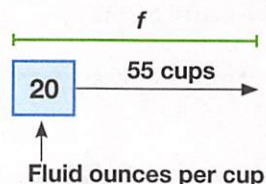
Math Practices and Problem Solving

13. **Algebra** In the last 3 months of the year, an electronics store sold 908 cell phones. How many cell phones did the store sell in December? Write and solve an equation.

Cell Phone Sales	
Month	Number Sold
October	319
November	257

14. The store sold 34 power cords. Each power cord sells for \$30. What was the total cost of the cords?

15. **MP.4 Model with Math** During a basketball game, 55 cups of lemonade were sold. Each cup holds 20 fluid ounces. How many total fluid ounces of lemonade were sold?

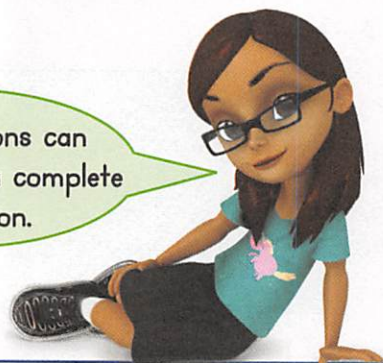


16. **Higher Order Thinking** There are 58 third graders at a school. Each third grader writes 4 book reports. Show how to use the Distributive Property to find the number of book reports written.

Common Core Assessment

17. William sold 17 magazine subscriptions for \$40 each. Abigail sold 28 subscriptions for \$30 each. Use arrays or area models to explain who raised more money.

Representations can help you write a complete explanation.



Name _____



Solve & Share

Suppose you are making gift baskets of fruit. You have 14 apples, and you plan to put 4 apples in each basket. How many baskets can you fill? Will there be any apples left over? If so, how many?

Solve this problem using any strategy you choose.

You can draw a picture to **model with math**. Show your work in the space below!



Step Up to Grade 4

Lesson 5

Interpret Remainders

I can ...

apply what I know about dividing items into equal groups to solve problems.

© **Content Standard** 4.NBT.B.6
Mathematical Practices MP.1, MP.2, MP.3, MP.4

Look Back! © **MP.4 Model with Math** How many apples are in the baskets? Write a multiplication sentence to represent the number of apples.

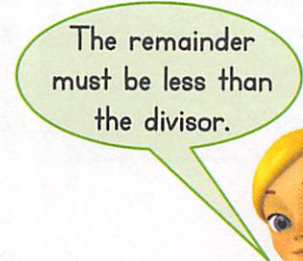
After Dividing, What Do You Do With the Remainder?

When you divide with whole numbers any whole number that remains after the division is complete is called the **remainder**.

Ned has 27 soccer cards in an album. He can put 6 cards on each page. He knows that $27 \div 6 = 4$ with 3 left over, because $6 \times 4 + 3 = 27$.

Use an R to write a remainder: $27 \div 6 = 4 R3$

How do you use the remainder to answer questions?



B How many pages can Ned fill?

To answer this question, find how many groups of 6 there are. The remainder can be ignored.

$$27 \div 6 = 4 R3$$

Ned can fill 4 pages.

C How many pages will Ned work on?

To answer this question, find how many groups are filled or started. Add 1 to the quotient, and ignore the remainder.

$$27 \div 6 = 4 R3$$

Ned will work on 5 pages.

D How many cards will Ned put on the fifth page?

The answer to this question is the remainder.

$$27 \div 6 = 4 R3$$

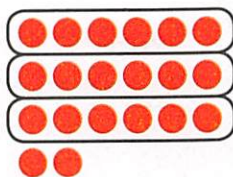
Ned will put 3 cards on the fifth page.

Convince Me! © **MP.1 Make Sense and Persevere** The calculation to the right is incorrect. What error was made? What is the correct answer? Draw a picture to help.

$$45 \div 6 = 6 R9$$

Another Example!

Use counters to find $20 \div 3$.
Write the quotient including
the remainder.



3 equal groups of 6 with 2 left over
 $20 \div 3 = 6 \text{ R}2$, because
 $3 \times 6 + 2 = 20$.

☆ Guided Practice

Do You Understand?

- MP.2 Reasoning** When a divisor is 4, can the remainder be 6? Explain.
- Mia is packing 27 sweaters into boxes. Each box will hold 4 sweaters. How many boxes will she fill? How many boxes will she need? Explain.

Do You Know How?

For **3–6**, find the number of groups and the number left over. Draw an array if needed.

- $14 \div 5 = \underline{\quad}$ with $\underline{\quad}$ left over
- $7 \div 3 = \underline{\quad}$ with $\underline{\quad}$ left over
- $18 \div 7 = \underline{\quad}$ with $\underline{\quad}$ left over
- $29 \div 3 = \underline{\quad}$ with $\underline{\quad}$ left over

☆ Independent Practice ☆

For **7–10**, find the number of groups and the number left over.

- $15 \div 2 = \underline{\quad}$ with $\underline{\quad}$ left over
- $28 \div 6 = \underline{\quad}$ with $\underline{\quad}$ left over
- $52 \div 5 = \underline{\quad}$ with $\underline{\quad}$ left over
- $34 \div 7 = \underline{\quad}$ with $\underline{\quad}$ left over

For **11–13**, interpret each remainder.

- 11.** 9 football cards,
4 cards on each page

How many pages can
Alex complete?

- 12.** 19 baseball cards,
6 cards on each page

How many cards are on
the 3rd page?

- 13.** 42 stickers, 8 stickers
on each page

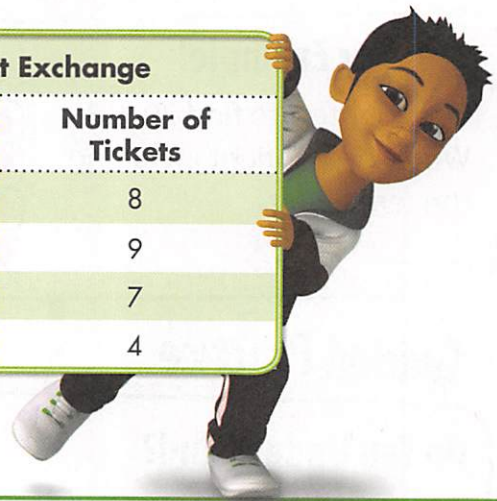
How many pages will
have some stickers?

Math Practices and Problem Solving

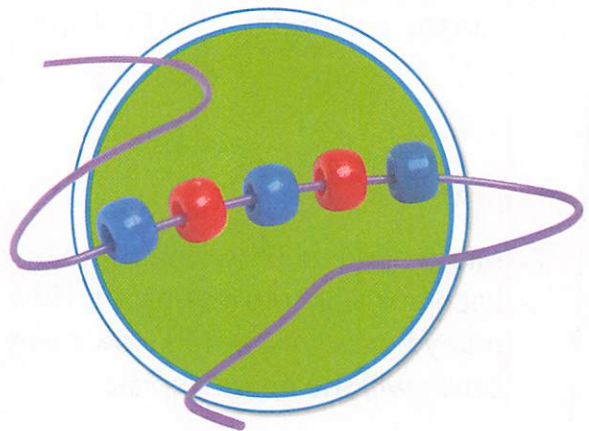
In 14–15, use the table at the right.

14. Madison has 50 prize tickets.
How many rings can she get?
15. Liam chose 4 yo-yos and 7 marbles.
How many tickets did he use?

Ticket Exchange	
Prize	Number of Tickets
Yo-yo	8
Ring	9
Marble	7
Sticker	4



16. Jayden makes necklaces like the one in the picture at the right. She has 14 blue beads and 9 red beads. How many necklaces can she make? How many of each color bead will be left over?



17. **MP. 3 Critique Reasoning** Michael calculated $29 \div 7 = 3 \text{ R}8$. Is his answer correct? If not, what is the correct answer? Explain.
18. **Higher Order Thinking** Write a problem that requires adding 1 to the quotient when interpreting the remainder.

Common Core Assessment

19. There are 33 children at a park. They want to make teams with 8 children on each team. Five of the children go home. How many complete teams can they make? Explain.

You can draw an array to help solve the problem.



Name _____



Solve & Share

Kyle and Jillian are working on a sports banner. They painted $\frac{3}{8}$ of the banner green and $\frac{4}{8}$ purple. How much of the banner have they painted? *Solve this problem any way you choose.*

You can use appropriate tools. You can use drawings, area models, or fraction strips to solve this problem. *Show your work in the space below!*



Step Up to Grade 4

Lesson 6

Model Addition of Fractions

I can ...

use tools such as fraction strips or area models to add fractions.

© Content Standard 4.NF.B.3a
Mathematical Practices MP.1, MP.2,
MP.4, MP.5

Look Back! © MP.5 Use Appropriate Tools Kyle says $\frac{1}{8} + \frac{1}{8} + \frac{1}{8} = \frac{3}{8}$. Jillian says $\frac{1}{8} + \frac{1}{8} + \frac{1}{8} = \frac{3}{24}$. Use fraction strips to decide who is correct.

A

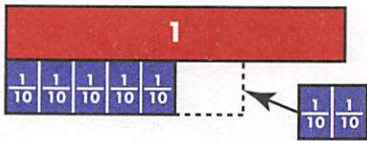
Ten canoeing teams are racing downriver. Five teams have silver canoes and two teams have brown canoes. What fraction of the canoes are either silver or brown?



You can use tools such as fraction strips to add two or more fractions.



B Find $\frac{5}{10} + \frac{2}{10}$. Use five $\frac{1}{10}$ fraction strips to show $\frac{5}{10}$ and two $\frac{1}{10}$ strips to show $\frac{2}{10}$.

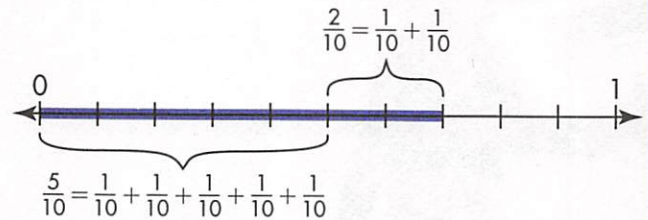


Five $\frac{1}{10}$ strips joined with two $\frac{1}{10}$ strips are seven $\frac{1}{10}$ strips.

Add the numerators. Then write the sum over the like denominator.

$$\frac{5}{10} + \frac{2}{10} = \frac{7}{10}$$

C Find $\frac{5}{10} + \frac{2}{10}$. Mark five $\frac{1}{10}$ segments to show $\frac{5}{10}$ and two $\frac{1}{10}$ segments to show $\frac{2}{10}$.



Adding $\frac{5}{10}$ and $\frac{2}{10}$ means joining five $\frac{1}{10}$ segments and two $\frac{1}{10}$ segments.

$\frac{7}{10}$ of the canoes are either silver or brown.



Convince Me! © MP.1 Make Sense and Persevere What two fractions would you add to find the fraction of the canoes that are either green or brown? What is the sum? How do you know your sum is correct?

Name _____

☆ Guided Practice

Do You Understand?

1. **MP.2 Reasoning** In the problem on the previous page, why aren't the purple $\frac{1}{10}$ strips the same length as the red strip?

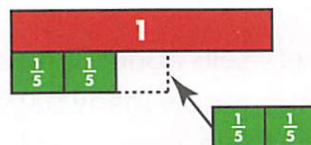
2. What two fractions are being added below? What is the sum?



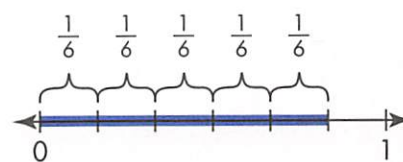
Do You Know How?

For 3–4, find each sum.

3. $\frac{2}{5} + \frac{2}{5}$



4. $\frac{1}{6} + \frac{4}{6}$



☆ Independent Practice

Leveled Practice For 5–16, find each sum. Use fraction strips or other tools.

5. $\frac{3}{12} + \frac{6}{12}$



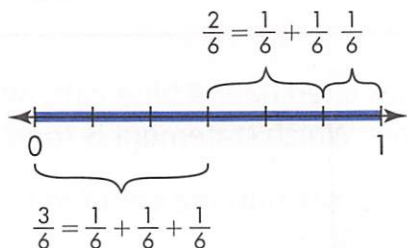
6. $\frac{4}{10} + \frac{4}{10}$



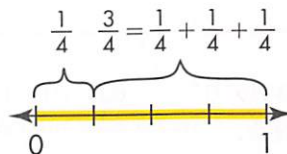
7. $\frac{2}{12} + \frac{6}{12}$



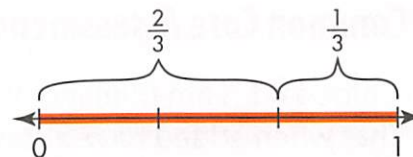
8. $\frac{3}{6} + \frac{2}{6} + \frac{1}{6}$



9. $\frac{1}{4} + \frac{3}{4}$



10. $\frac{2}{3} + \frac{1}{3}$



11. $\frac{4}{8} + \frac{1}{8}$

12. $\frac{1}{12} + \frac{3}{12}$

13. $\frac{4}{10} + \frac{3}{10}$

14. $\frac{1}{8} + \frac{6}{8}$

15. $\frac{2}{6} + \frac{3}{6}$

16. $\frac{1}{10} + \frac{2}{10} + \frac{4}{10}$

Math Practices and Problem Solving

17. **Number Sense** Using four different numerators, write an equation in which four fractions, when added, have a sum of 1.

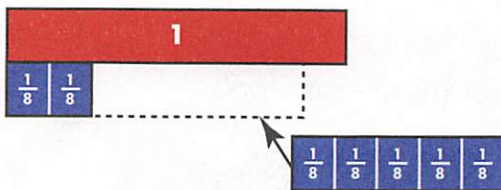
18. **MP.4 Model with Math** A rope is divided into 10 equal parts. Draw a picture to show $\frac{3}{10} + \frac{5}{10} = \frac{8}{10}$.

19. A bakery sells about 5 dozen bagels per day. About how many bagels does the bakery sell in 3 days? Explain.

There are 12 bagels in one dozen.



20. What addition problem is shown by the fraction strips below?



21. **Higher Order Thinking** Elizabeth ran $\frac{2}{10}$ of the distance from school to home. She walked $\frac{3}{10}$ more of the distance and then skipped $\frac{1}{10}$ more of the distance. What fraction of the distance home does Elizabeth still have to go?

Look back to see if you answered the question that was asked.



Common Core Assessment

22. Chloe said, "I am thinking of two fractions that when added have a sum of one." Which fractions could Chloe have been thinking about?

- (A) $\frac{1}{2}$ and $\frac{2}{2}$
- (B) $\frac{1}{6}$ and $\frac{2}{6}$
- (C) $\frac{3}{8}$ and $\frac{5}{8}$
- (D) $\frac{3}{5}$ and $\frac{4}{5}$

23. Andrew has 6 red hats, 4 blue hats, and 2 black hats. Which statement is true?

- (A) $\frac{2}{12}$ of the hats are either red or black.
- (B) $\frac{4}{12}$ of the hats are either red or black.
- (C) $\frac{1}{2}$ of the hats are either red or black.
- (D) $\frac{8}{12}$ of the hats are either red or black.

Name _____



Solve & Share

Karyn has $\frac{11}{8}$ pounds of chili to put into three bowls. The amount of chili in each bowl does not have to be the same. How much chili could Karyn put into each bowl? *Solve this problem any way you choose.*

How can you **model** the amount of chili Karyn puts in each bowl? *Show your work in the space below!*



Step Up to Grade 4

Lesson 7

Decompose Fractions

I can ...

use fraction strips, area models, or drawings to decompose fractions.

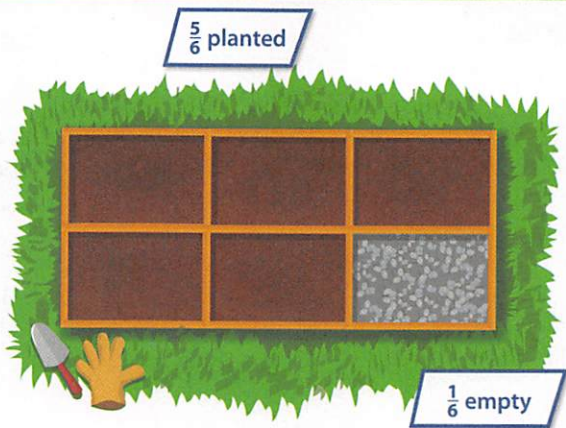
© Content Standard 4.NF.B.3b
Mathematical Practices MP.2, MP.4, MP.5

Look Back! © **MP.5 Use Appropriate Tools** Use a drawing or fractions strips to help write equivalent fractions for the amount of chili in one of the bowls.

How Can You Represent a Fraction in a Variety of Ways?

A

Charlene wants to leave $\frac{1}{6}$ of her garden empty. What are some different ways Charlene can plant the rest of her garden?



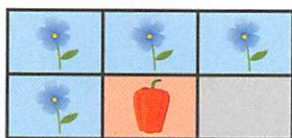
Decompose means to break into parts. **Compose** means to combine parts. The fraction of the garden that Charlene will plant can be decomposed in more than one way.



B One Way

Charlene could plant four $\frac{1}{6}$ sections with blue flowers and one $\frac{1}{6}$ section with red peppers.

$\frac{5}{6}$ is $\frac{4}{6}$ and $\frac{1}{6}$.

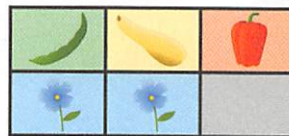


$$\frac{5}{6} = \frac{4}{6} + \frac{1}{6}$$

C Another Way

Charlene could plant one $\frac{1}{6}$ section with green beans, one $\frac{1}{6}$ section with yellow squash, one $\frac{1}{6}$ section with red peppers, and two $\frac{1}{6}$ sections with blue flowers.

$\frac{5}{6}$ is $\frac{1}{6}$ and $\frac{1}{6}$ and $\frac{1}{6}$ and $\frac{2}{6}$.



$$\frac{5}{6} = \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{2}{6}$$

Convince Me! © MP.5 Use Appropriate Tools Draw pictures or use fraction strips to show why these equations are true.

$$\frac{5}{6} = \frac{3}{6} + \frac{2}{6}$$

$$\frac{5}{6} = \frac{1}{6} + \frac{2}{6} + \frac{2}{6}$$

Another Example! How can you decompose $3\frac{1}{8}$?

$3\frac{1}{8}$ is 1 whole + 1 whole + 1 whole + $\frac{1}{8}$.

Each whole can also be shown as eight equal parts.



$$3\frac{1}{8} = 1 + 1 + 1 + \frac{1}{8}$$

$$3\frac{1}{8} = \frac{8}{8} + \frac{8}{8} + \frac{8}{8} + \frac{1}{8}$$

A **mixed number** has a whole number part and a fraction part.



★ Guided Practice

Do You Understand?

- MP.4 Model with Math** Draw a model to show one way to decompose $\frac{6}{8}$.
- Sam said the sum of $\frac{2}{8} + \frac{3}{8} + \frac{4}{8}$ is the same as the sum of $\frac{1}{8} + \frac{4}{8} + \frac{4}{8}$. Is she correct? Explain.

Do You Know How?

For 3–4, decompose each fraction or mixed number in two different ways. Use drawings or fraction strips as needed.

$$3. \quad \frac{3}{6} = \frac{\square}{\square} + \frac{\square}{\square} \quad \frac{3}{6} = \frac{\square}{\square} + \frac{\square}{\square} + \frac{\square}{\square}$$

$$4. \quad 1\frac{1}{5} = \frac{\square}{\square} + \frac{\square}{\square} \quad 1\frac{1}{5} = \frac{\square}{\square} + \frac{\square}{\square}$$

★ Independent Practice

Leveled Practice For 5–10, decompose each fraction or mixed number in two different ways. Use drawings or fraction strips as needed.

$$5. \quad \frac{4}{10} = \frac{\square}{\square} + \frac{\square}{\square} \quad \frac{4}{10} = \frac{\square}{\square} + \frac{\square}{\square} + \frac{\square}{\square}$$

$$6. \quad \frac{3}{7} = \frac{\square}{\square} + \frac{\square}{\square} \quad \frac{3}{7} = \frac{\square}{\square} + \frac{\square}{\square} + \frac{\square}{\square}$$

$$7. \quad 1\frac{3}{4} = \frac{\square}{\square} + \frac{\square}{\square} \quad 1\frac{3}{4} = \frac{\square}{\square} + \frac{\square}{\square} + \frac{\square}{\square}$$

$$8. \quad 3\frac{1}{2} = \frac{\square}{\square} + \frac{\square}{\square} \quad 3\frac{1}{2} = \frac{\square}{\square} + \frac{\square}{\square} + \frac{\square}{\square}$$

$$9. \quad \frac{7}{8} = \frac{\square}{\square} + \frac{\square}{\square}$$

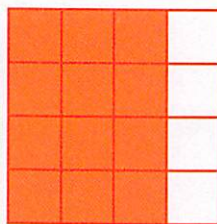
$$10. \quad 2\frac{1}{3} = \frac{\square}{\square} + \frac{\square}{\square} \quad 2\frac{1}{3} = \frac{\square}{\square} + \frac{\square}{\square} + \frac{\square}{\square}$$

Math Practices and Problem Solving

11. Mathew ate $\frac{3}{10}$ of a bag of popcorn. He shared the rest with Addison. List three ways they could have shared the remaining popcorn.

12. © **MP.4 Model with Math** Draw an area model to show $\frac{3}{8} + \frac{2}{8} + \frac{2}{8} = \frac{7}{8}$.

13. In a class of 16 students, 12 students are girls. Write two equivalent fractions that tell which part of the class is girls.



The area model shows 16 sections. Each section is $\frac{1}{16}$ of the class.



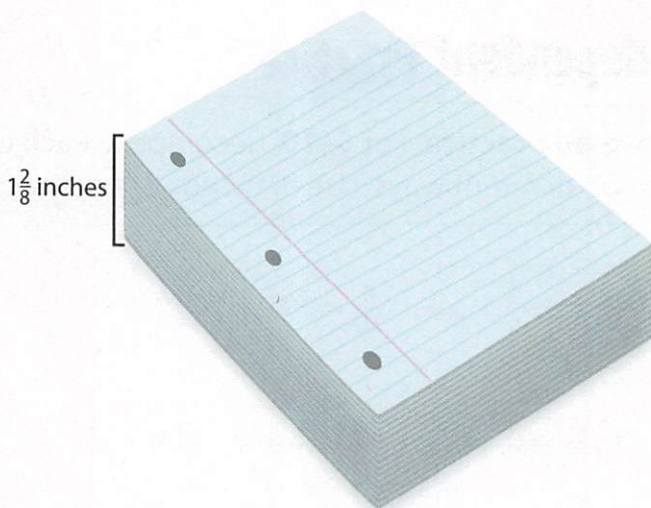
14. There were 56 girls and 71 boys at a school play. Each ticket to the play costs \$8. How much were all the tickets to the performance?

15. **Higher Order Thinking** Jason wrote $1\frac{1}{2}$ as the sum of three fractions. None of the fractions had a denominator of 2. What fractions might Jason have used?

© Common Core Assessment

16. A teacher distributes a stack of paper to 3 groups. Each group received a different amount of paper. Select all the ways the teacher can distribute the paper by decomposing $1\frac{2}{8}$ inches. Use fraction strips if needed.

- $1 + \frac{1}{8} + \frac{1}{8}$
- $\frac{3}{8} + \frac{4}{8} + \frac{5}{8}$
- $\frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$
- $\frac{2}{8} + \frac{3}{8} + \frac{5}{8}$
- $1 + \frac{3}{6}$



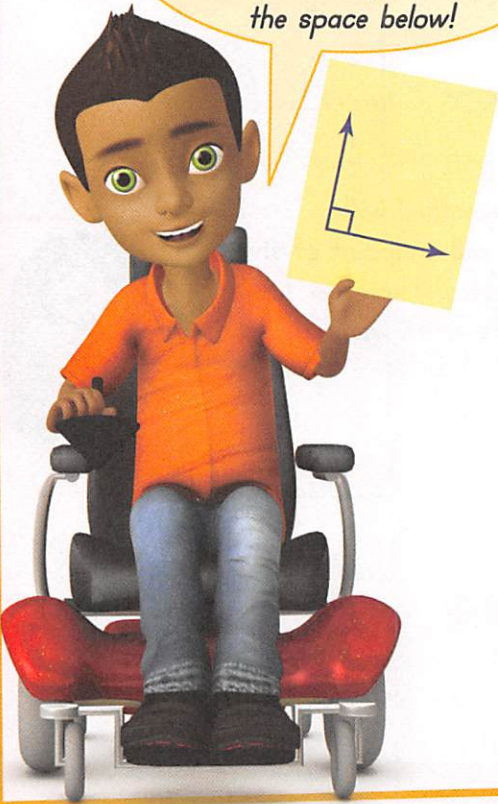
Name _____



Solve & Share

A right angle forms a square corner, like the one shown below. Draw two angles that are open less than the right angle. *Solve this problem any way you choose.*

You can use **reasoning**. The closer the sides of an angle, the smaller the angle measure. *Show your work in the space below!*



Step Up to Grade 4

Lesson 8

Lines, Rays, and Angles

I can ...

recognize and draw lines, rays, and angles with different names.

© **Content Standards** 4.MD.C.5, 4.G.A.1
Mathematical Practices MP.2, MP.4, MP.6, MP.7

Look Back! © **MP.2 Reasoning** Draw an angle that is open more than a right angle.

Point, line, line segment, ray, right angle, acute angle, obtuse angle, and straight angle are common geometric terms.

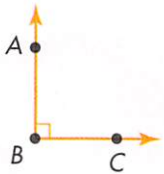


Lines and parts of lines are named for their points. A ray is named with its endpoint first.

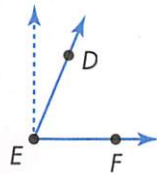
Geometric Term	Example	Label	What You Say
A point is an exact location in space.		Point Z	Point Z
A line is a straight path of points that goes on and on in opposite directions.		\overleftrightarrow{AB}	Line AB
A line segment is a part of a line with two endpoints.		\overline{GR}	Line Segment GR
A ray is a part of a line that has one endpoint and continues on forever in one direction.		\overrightarrow{NO}	Ray NO

An angle is formed by two rays that have the same endpoint.

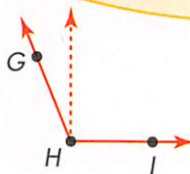
Angles are named with 3 letters. The shared endpoint of the rays is the center letter. The other letters represent points from each ray.



$\angle ABC$ is a right angle. A **right angle** forms a square corner.



$\angle DEF$ is an acute angle. An **acute angle** is open less than a right angle.

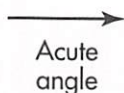
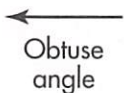


$\angle GHI$ is an obtuse angle. An **obtuse angle** is open more than a right angle but less than a straight angle.



$\angle JKL$ is a straight angle. A **straight angle** forms a straight line.

Convince Me! © MP.7 Look for Relationships Complete each figure to show the given angle.



Name _____

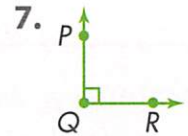
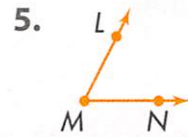
☆ Guided Practice

Do You Understand?

1. © **MP.6 Be Precise** What geometric term describes a part of a line that has two endpoints? Draw an example.
2. What geometric term describes part of a line that has only one endpoint? Draw an example.
3. Which geometric term describes an angle that forms a square corner? Draw an example.

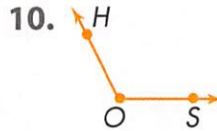
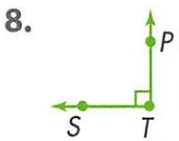
Do You Know How?

For 4–7, use geometric terms to describe what is shown.



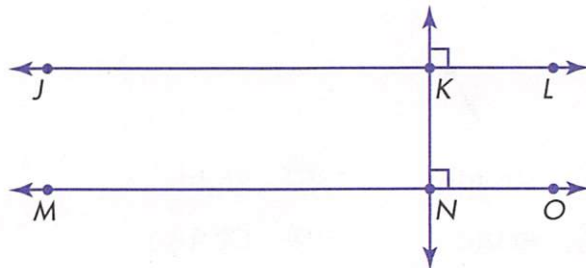
☆ Independent Practice ☆

For 8–11, use geometric terms to describe what is shown.



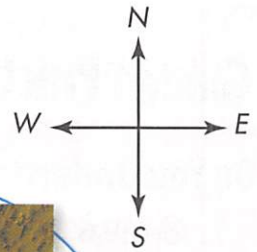
For 12–14, use the diagram at the right.

12. Name 2 right angles.
13. Name four rays.
14. Name four line segments.



Math Practices and Problem Solving

For 15–17, use the map of Nevada. Write the geometric term that best fits each description. Draw an example.



15. © **MP.6 Be Precise** The route between 2 cities.

16. The cities

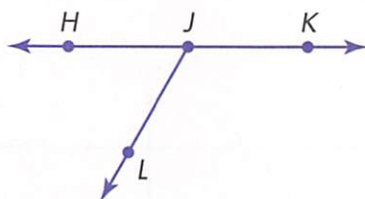
17. Where the north and east borders meet

18. **A-Z Vocabulary** Write a definition for *obtuse angle*. Draw an obtuse angle. Give 3 examples of obtuse angles in the classroom.

19. **Higher Order Thinking** Jarrett says he can make a right angle with an acute angle and an obtuse angle that have a common ray. Is Jarrett correct? Draw a picture and explain.

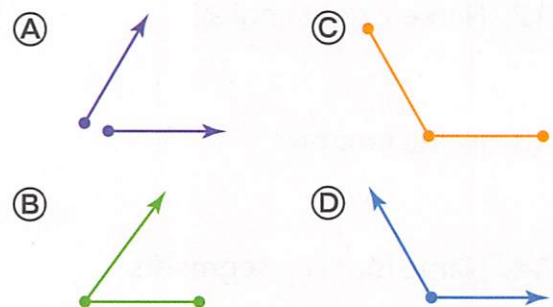
© Common Core Assessment

20. Which geometric term describes $\angle HJL$?



- (A) Straight
- (B) Acute
- (C) Right
- (D) Obtuse

21. Lou drew 2 rays that share an endpoint. Which of the following is Lou's drawing?



Name _____



Solve & Share

If a clock shows it is 3 o'clock, how could you describe the smaller angle made by the two hands of the clock? *Solve this problem any way you choose.*

You can **make sense** of the problem by using what you know about acute, right, and obtuse angles. *Show your work in the space below!*



Step Up to Grade 4

Lesson 9

Understand Angles and Unit Angles

I can ...

use what I know about fractions to measure angles.

© **Content Standard** 4.MD.C.5a
Mathematical Practices MP.1, MP.2, MP.3, MP.4

Look Back! © **MP.2 Reasoning** What two fractions do the hands divide the clock into?

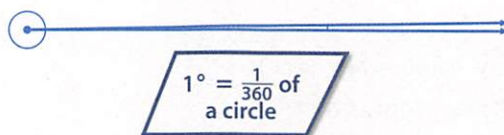
Essential Question

What is the Unit Used to Measure Angles?

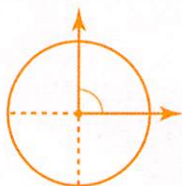
A

An angle is measured with units called **degrees**. An angle that turns through $\frac{1}{360}$ of a circle is called a **unit angle**. How can you determine the angle measure of a right angle and of angles that turn through $\frac{1}{6}$ and $\frac{2}{6}$ of a circle?

An angle that measures 1° is a unit angle or one-degree angle.



B Divide to find the angle measure of a right angle.



Right angles divide a circle into 4 equal parts.

$$360^\circ \div 4 = 90^\circ$$

The angle measure of a right angle is 90° .

C Multiply to find the measure of an angle that turns through $\frac{1}{6}$ of a circle.

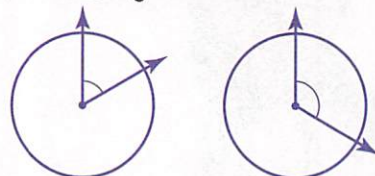


Multiply by $\frac{1}{6}$ to calculate the angle measure.

$$\frac{1}{6} \times 360^\circ = \frac{360^\circ}{6} \text{ or } 60^\circ$$

The angle measure is 60° .

D Add to find the measure of an angle that turns through $\frac{2}{6}$ of a circle.



$$\frac{1}{6} = 60^\circ$$

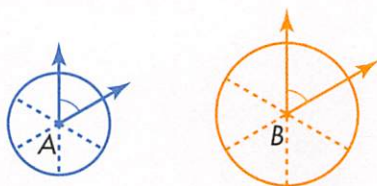
$$\frac{2}{6} = ?$$

Remember that $\frac{2}{6} = \frac{1}{6} + \frac{1}{6}$. So you can add to calculate the measure of $\frac{2}{6}$ of a circle.

$$60^\circ + 60^\circ = 120^\circ$$

The angle measure of $\frac{2}{6}$ of a circle is 120° .

Convince Me! © MP.3 Critique Reasoning Susan thinks the measure of angle B is greater than the measure of angle A. Do you agree? Explain.



Another Example!

Find the fraction of a circle that an angle with a measure of 45° turns through.

A 45° angle turns through $\frac{45}{360}$ of a circle.

$45^\circ \times 8 = 360^\circ$, so 45° is $\frac{1}{8}$ of 360° .

One 45° angle is $\frac{1}{8}$ of a circle.



$$45^\circ = \frac{1}{8} \text{ of a } 360^\circ \text{ circle}$$

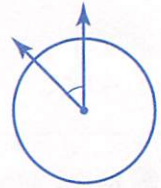
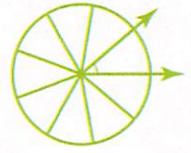
☆ Guided Practice

Do You Understand?

1. What fraction of the circle does a 90° angle turn through?
2. **MP.4 Model with Math** Maya cuts a pie into 3 equal pieces. What is the angle measure of each piece? Write and solve an equation.

Do You Know How?

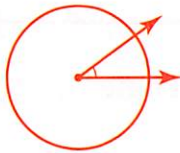
3. A circle is divided into 9 equal parts. What is the angle measure of one of those parts?
4. The angle turns through $\frac{1}{8}$ of the circle. What is the measure of this angle?



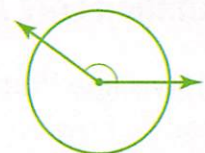
☆ Independent Practice ☆

For 5–8, find the measure of each angle.

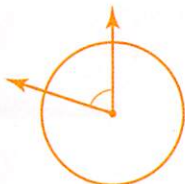
5. The angle turns through $\frac{1}{10}$ of the circle.



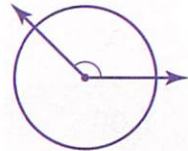
6. The angle turns through $\frac{2}{5}$ of the circle.



7. The angle turns through $\frac{1}{5}$ of the circle.



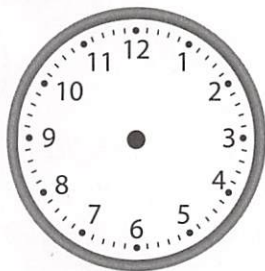
8. The angle turns through $\frac{3}{8}$ of the circle.



Math Practices and Problem Solving

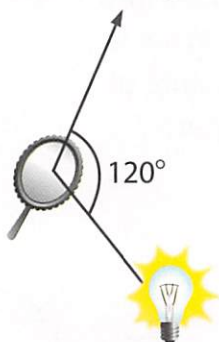
9. **MP.2 Reasoning** Use the clock to find the measure of the smaller angle formed by the hands at each time.

- a. 9:00
- b. 8:00
- c. 5:00



10. **Algebra** Natalie wrote an equation to find an angle measure. What do the unknowns a and b represent in Natalie's equation? $360^\circ \div a = b$

11. **Math and Science** A mirror can be used to reflect a beam of light at an angle. What fraction of a circle would the angle shown turn through?



12. David paid \$421 for three plane tickets. One ticket cost \$159. Another ticket cost \$138. How much did the other ticket cost?



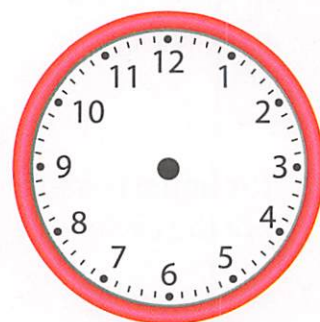
13. **MP.1 Make Sense and Persevere** A pizza was cut into equal parts. Three pieces of the pizza were eaten. The 5 pieces that remained created an angle that measured 225° . What was the angle measure of one piece of pizza?

14. **Higher Order Thinking** Alexis cut a round cake into 12 equal pieces. 5 of the pieces were eaten. What is the angle measure of the cake that was left?

Common Core Assessment

15. Draw a line from the time to the smaller angle the time would show on a clock. Use the clock to help.

1:00	180°
2:00	60°
6:00	120°
4:00	30°

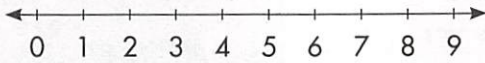


Name _____



Solve & Share

The number line below is an example of a line. A line goes on forever in a straight path in two directions. Draw the following pairs of lines: two lines that will never cross, two lines that cross at one point, two lines that cross at two points. If you cannot draw the lines, tell why.



Step Up to Grade 4

Lesson 10 Lines

I can ...

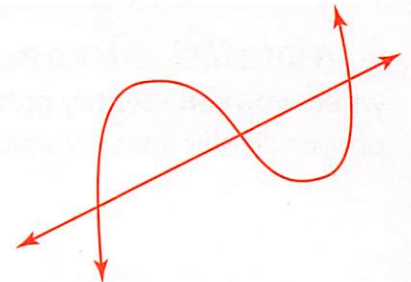
draw and identify perpendicular, parallel, and intersecting lines.

© Content Standard 4.G.A.1
Mathematical Practices MP.3, MP.4, MP.6

Be precise. Think of and use math language you already know. Show your work in the space below!



Look Back! © MP.6 Be Precise Terry said, "The lines shown intersect at three points." Is Terry correct? Explain.

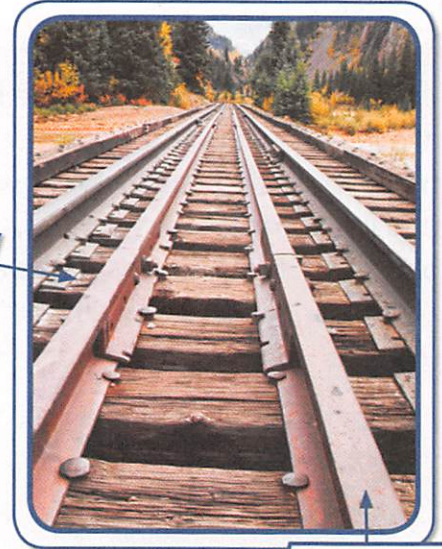


A

A line is a straight path of points that goes on and on in opposite directions. A pair of lines can be described as parallel, perpendicular, or intersecting.



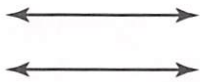
The railroad tracks in the picture are parallel because they never meet. The railroad ties are perpendicular to the railroad tracks because they intersect at right angles.



Railroad tie

Railroad track

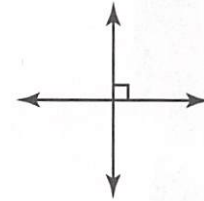
B Pairs of lines are given special names depending on their relationship.



Parallel lines never intersect.



Intersecting lines pass through the same point.



Perpendicular lines are lines that form right angles.

Convince Me! © **MP.6 Be Precise** Find examples in your classroom where you can identify parallel lines, intersecting lines, and perpendicular lines. Explain.

Name _____

★ Guided Practice

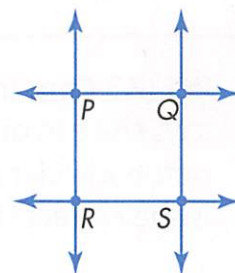
Do You Understand?

1. **MP.6 Be Precise** What geometric term could you use to describe the bottom edges that cross and make square corners in an aquarium?
2. What pair of lines looks like the blades of an open pair of scissors? Why?

Do You Know How?

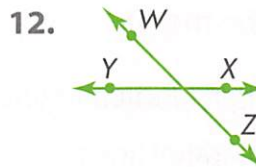
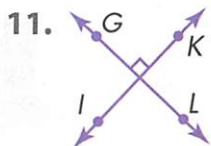
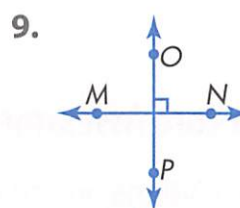
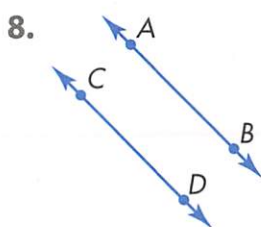
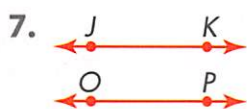
For 3–6, use the diagram.

3. Name four points.
4. Name four lines.
5. Name two pairs of parallel lines.
6. Name two pairs of perpendicular lines.



★ Independent Practice

For 7–15, use the best geometric terms to describe what is shown.



Math Practices and Problem Solving

16. © **MP.3 Construct Arguments** Josh names this line \overleftrightarrow{AC} . Ava names the line \overleftrightarrow{AB} . Who is correct? Explain.



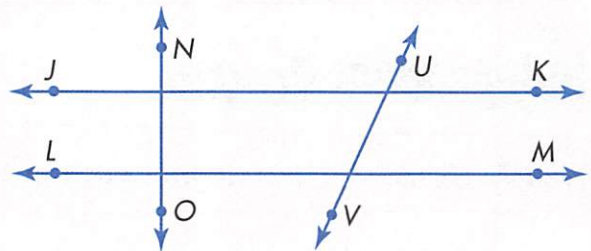
Think about math vocabulary when you write explanations.



17. © **MP.3 Construct Arguments** Josie says she can draw two lines that are both perpendicular and parallel to each other? Is she correct? Explain.

18. © **MP.4 Model with Math** Draw three lines so two of the lines intersect and the third line is perpendicular to one of the lines. The lines should meet at exactly one point. Label the lines with points.

19. **Higher Order Thinking** If all perpendicular lines are also intersecting lines, are all intersecting lines also perpendicular? Use the picture at the right to explain.



© Common Core Assessment

20. Look at the wings on the plane. Which geometric term would you use to describe them?

- (A) Perpendicular lines
- (B) Parallel lines
- (C) Intersecting lines
- (D) Plane

