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GUIDED INSTRUCTION

THINK ABOUT IT

Start by looking at the first number in word form.

1. Write the standard form of each number:

   - five thousand, three hundred two
   - 600,000 + 3,000 + 200 + 90 + 2

   Step One Look at the first number: five thousand, three hundred two

   There are 5 thousands, 3 hundreds, 0 tens, and 2 ones in the number.

   Use these digits to write the number in standard form: 5,302

   Step Two Look at the second number: 600,000 + 3,000 + 200 + 90 + 2

   You could add the numbers in a column to line up the place value columns.

```
  6 0 0, 0 0 0
      3, 0 0 0
        2 0 0
            9 0
+               2
-----------------
  6 0 3, 2 9 2
```

2. Find the value of each underlined digit.

   139,750

   The 5 is in the tens place. It has a value of 5 tens, or 50.

   986,265

   The 8 is in the ten thousands place. It has a value of 8 ten thousands, or 80,000.

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3. Use a symbol to compare 507,234 and 507,251. Start on the left. Compare using = (equal), < (less than), or > (greater than).

Step One Compare the hundred thousands.	507,234	=	507,251
Step Two Compare the ten thousands.	507,234	=	507,251
Step Three Compare the thousands.	507,234	=	507,251
Step Four Compare the hundreds.	507,234	=	507,251
Step Five Compare the tens.	507,234	<	507,251

4. Select TWO numbers that are greater than 873,910.

   (A) 9,896
   (B) 869,999
   (C) 900,000
   (D) 873,940
   (E) 873,099

5. Select TWO expressions that are equal to 8,000.

   (A) 80 × 10
   (B) 80 × 100
   (C) 800 × 10
   (D) 800 × 100

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TURN AND TALK

Look at the digit in the tens place of the number of 96,662. In what place-value position exists a number that is 100 times as great as the value of this digit.

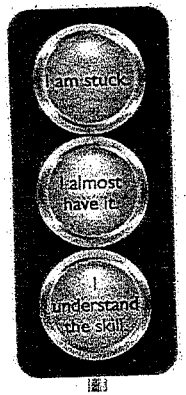
How Am I Doing?

What questions do you have?

Why is it important to understand place value?

How could you use your knowledge of expanded form in real life?

Color in the traffic signal that shows how you are doing with the skill.



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INDEPENDENT PRACTICE

Answer the questions.

1. What are TWO other ways to write the number one hundred fifty-six thousand, two hundred five?

   (A) 15,625
   (B) 150,625
   (C) 100,000 + 50,000 + 6,000 + 200 + 5
   (D) 100,000 + 50,000 + 6,000 + 200 + 50 + 1
   (E) 10,000 + 5,000 + 6,000 + 200 + 5
   (F) 156,205

2. What is the standard form of the number 700,000 + 30,000 + 400 + 10 + 9?

   Write your answer in the box.

   730,419

3. What is the value of the underlined digit in 879,314?

   (A) 700
   (B) 7,000
   (C) 70,000
   (D) 700,000

4. Select THREE numbers that are greater than 98,437.

   (A) 99,000
   (B) 98,450
   (C) 98,096
   (D) 98,427
   (E) 97,928
   (F) 100,000

HINT, HINT

Use place value to help you write numbers in different forms.

WORK SPACE

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HINT, HINT

When comparing numbers, start at the left. Compare digits until you find the first place value in which the digits are different.

5. Use the numbers in the box to complete each statement. The numbers cannot be used more than once. Write each number in the appropriate box.

490,678	238,690	238,969

238,960 > 238,690

452,976 < 490,678

309,874 < 238,969

6. Compare the numbers. Write the symbol in the box that correctly completes the statement.

139,056 < 139,506

7. Compare the numbers. Write the symbol in the box that correctly completes the statement.

50 × 10 = 5,000 ÷ 10

TIPS AND TRICKS

On a computer-based test, you might click or highlight the correct answer.

8. Part A

The table shows the number of people who bought movie tickets over a weekend.

Movie Ticket Sales	
Day	Tickets Sold
Saturday	102,985
Sunday	110,035

Did more people buy tickets on Saturday or Sunday?

Sample answer: More people bought tickets on Sunday.

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Part B

Explain your reasoning to Part A.

Sample answer: When I compare the numbers, both have the same number of hundred thousands, but 110,035 has more ten thousands than 102,985 does.

9. Explain why 123 × 10 = 1,230.

Sample answer: Multiplying by 10 makes each digit's place value 10 times larger, moving each digit to the left. The 1 hundred becomes 1 thousand. The 2 tens become 2 hundreds, and the 3 ones become 3 tens.

WORK SPACE

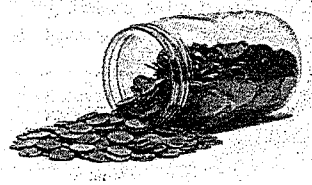
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EXIT TICKET

4.NBT.1, 4.NBT.2

Now that you have mastered reading and writing multi-digit numbers, let's solve the problem in the Real-World Connection.

Two schools are having a penny-collecting contest. The school that collects the most pennies wins the contest. The chart shows the number of pennies collected by each school. Use your knowledge of place value to determine which number is greater. Which school collected more pennies?



School	Number of Pennies
Central Elementary	234,896
Sky Heights Elementary	234,862

Central Elementary collected more pennies.

Compare 234,896 and 234,862. Both numbers start with 234 thousands. The hundreds place is also the same, but the digits in the tens place are different. Since 9 tens is greater than 6 tens, 234,896 is greater than 234,862.

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THINK ABOUT IT

Why is using a number line so useful for rounding numbers?

SKETCH IT

Draw a number line to show whether 5,400 is closer to 5,000 or 6,000.

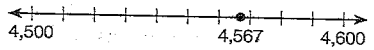
TURN AND TALK

Think about the problem from the beginning of the lesson. Do you think knowing how to estimate by rounding will help you solve the problem?

EXAMPLE

Round 4,567 to the nearest hundred.

Is 4,567 closer to 4,500 or 4,600?



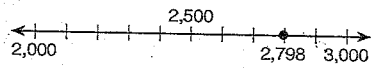
Each mark on the number line is ten. You can see that 4,567 is closer to 4,600. So, 4,567 rounds to 4,600 when rounded to the nearest hundred.

- To decide if a number is closer to the higher or lower number, compare the number to the halfway point. For 4,567, the halfway point between 4,500 and 4,600 is 4,550.
  - If the digit to the right of the place value you are rounding to is 5 or more, round up. If it is less than 5, round down.

EXAMPLE

Round 2,798 to the nearest thousand. Is 2,798 closer to 2,000 or 3,000?

The digit to the right of 2 is 7. Since 7 is greater than 5, round up to 3,000.



EXAMPLE

If the digit to the right is less than 5, round down because the number is less than halfway.

In July, Shelly's Beach Shack sold 674 T-shirts and 504 pairs of flip-flops. About how many more T-shirts did they sell than flip-flops?

Step One Round the number of T-shirts and flip-flops.

There are about 700 T-shirts because 674 is closer to 700 than 600.

There are about 500 flip-flops because 504 is very close to 500.

Step Two Mentally subtract 500 from 700.

$700 - 500 = 200$

Shelly's Beach Shack sold about 200 more T-shirts than flip-flops.

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GUIDED INSTRUCTION

1. Round 8,562 to the nearest thousand.

Step One Look in the thousands place.

8,562 8 is in the thousands place.

Step Two Next, look at the number in next place value to the right.

8,562 5 is to the right of 8.

Step Three Round up if the digit in the next place value is 5 or more. Round down if it is less than 5.

Since the digit to the right of the thousands place is 5 or more, round 8 up to 9.

Step Four Write the rounded number.

8,562 rounded to the nearest thousand is 9,000

2. The driving distance from Michael's house to the lake is 179 miles. Later, Michael's family will drive 86 more miles to the mountains. About how far will they drive altogether?

Step One The question uses the word "about". To find the simplest answer, round each number to the greatest place value.

179 to the nearest 100 is 200

86 to the nearest 10 is 90

Step Two Add the rounded numbers.

$200 + 90 =$ 290

Step Three Round to the nearest 100.

290 can be rounded to 300

Step Four State the solution.

The family will have to drive about 300 miles altogether.

TURN AND TALK

How could you round in a different way to find a more accurate estimate?

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TIPS AND TRICKS

If the digit to the right of the given place value is 5 or more, round up.

3. Select the THREE statements that are true.

   (A) 563 rounded to the nearest ten is 560.

   (B) 1,489 rounded to the nearest thousand is 1,500.

   (C) 22,786 rounded to the nearest ten thousand is 23,000.

   (D) 647,982 rounded to the nearest ten thousand is 650,000.

   (E) 910,840 rounded to the nearest hundred thousand is 900,000.

4. Select the TWO answers that when rounded to the nearest thousand is 3,000, and when rounded to the nearest hundred is 2,800.

   (A) 2,795

   (B) 2,731

   (C) 2,843

   (D) 2,861

   (E) 3,182

   (F) 3,815

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How Am I Doing?

What questions do you have?

When might you round down on an estimate?

Explain a situation when rounding to the nearest ten or hundred would be useful.

TURN AND TALK

Work with a partner to solve this: Josie is thinking of a number with five digits. When she rounds her number to the nearest thousand, it is 16,000. Give two examples of numbers, one with a 5 in the thousands place and one with a 6 in the thousands place, that she could be thinking of. Explain.

Color in the traffic signal that shows how you are doing with the skill.



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INDEPENDENT PRACTICE

Answer the questions.

1. Select the FOUR statements that are true.

   (A) 429 rounded to the nearest ten is 400.
   (B) 903 rounded to the nearest hundred is 900.
   (C) 2,975 rounded to the nearest ten is 2,980.
   (D) 34,822 rounded to the nearest ten thousand is 30,000.
   (E) 318,459 rounded to the nearest hundred thousand is 320,000.
   (F) 540,678 rounded to the nearest ten is 540,680.

2. What is 210,899 rounded to the nearest hundred thousand?

   Write your answer in the box.

   200,000

3. What is 812,543 rounded to the nearest ten thousand?

   Write your answer in the box.

   810,000

HINT, HINT

To round, start with the digit in the place value to which you are rounding.

4. What is 67,291 rounded to the nearest hundred?

   (A) 67,290
   (B) 67,300
   (C) 67,000
   (D) 70,000

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5. What is 855,378 rounded to the nearest hundred thousand?

   (A) 800,000
   (B) 850,000
   (C) 860,000
   (D) 900,000

6. Which word correctly completes the statement?

   45,678 rounded to the nearest _____ is 46,000.

   (A) ten
   (B) hundred
   (C) thousand
   (D) ten thousand

HINT, HINT

Look to see where the first number after zero is located according to place value.

7. Which word correctly completes the statement?

   194,038 rounded to the nearest is _____ 190,000.

   (A) hundred
   (B) thousand
   (C) ten thousand
   (D) hundred thousand

8. Yanni's Flower Shop sells rose bushes. The table shows the number of rose bushes the shop sold during two months of spring.

Rose Bush Sales	
Month	Rose Bushes Sold
April	139
May	195

About how many more rose bushes were sold in May than April? Estimate by rounding. Describe the steps you used.

Sample answer: About 60 more bushes were sold in May than in April. I rounded 139 to 140 since 139 is 1 away from 140. I rounded 195 to 200 since it is only 5 away from 200. I know that 140 is 60 away from 200, so 60 more bushes were sold in May.

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TIPS AND TRICKS

Make sure to write your answer and explain how you found your answer.

WORK SPACE

Part A

Greg's fourth-grade class collected cans for a recycling program. They collected a total of 2,853 cans over the school year. Greg says that the class collected about 2,800 cans. Is he correct? What would be a better estimate? Explain your reasoning.

Sample answer: No. He should get 2,850 if he rounds to the nearest ten. He should get 2,900 if he rounds to the nearest hundred. He should get 3,000 if he rounds to the nearest thousand.

Part B

Another fourth-grade class collected 4,983 cans. Estimate the total number of cans collected by both fourth-grade classes. Explain your reasoning.

Sample answer: The total number of cans is about 8,000. I can round each number to the nearest thousand. I can round 2,853 to 3,000, and 4,983 to 5,000. I can mentally add 3,000 and 5,000 to get 8,000.

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EXIT TICKET

4.NBT.3

Now that you have mastered rounding numbers, let's solve the problem in the Real-World Connection.

Education Central is a large company that delivers school supplies. They received one order for 1,290 pencils and another order for 1,850 pencils. About how many pencils are there altogether?

Use estimation to find the answer. Start by rounding each number to the nearest thousand. Then, add the rounded numbers.

About 3,000 pencils are needed to fill both orders.

Round 1,290 to 1,000 and 1,850 to 2,000. Then, add 1,000 + 2,000.

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GUIDED INSTRUCTION



Did you know that you can multiply stacks of coins to determine their value?

THINK ABOUT IT

Start by looking at the numbers given.

1. Write an equation to show that 28 is 4 times as many as 7.

Step One Interpret the first part of the statement:

28 =

28 is 4 times as many as 7.

In this statement, is means equals.

Step Two Interpret the next part of the statement:

28 = 4 × 7

28 is 4 times as many as 7.

The word times tells you to use multiplication.

Step Three See if the equation matches the statement.

28 = 4 × 7

28 is 4 times as many as 7.

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2. Alyssa lives 4 miles from the movie theater. Tyrone lives 3 times as many miles from the theater as Alyssa. Write and solve an equation to find out how far Tyrone lives from the movie theater.

Step One Look at the information given:

Tyrone lives 3 times as far as Alyssa. Alyssa lives 4 miles from the theater.

Write a comparison statement.

3 times as many as 4

Step Two Represent the statement as an equation.

3 × 4 = ☐

Step Three Multiply the numbers to find the product.

3 × 4 = 12

Step Four Write the solution in a sentence.

Tyrone lives 12 miles from school.

HINT, HINT

The word "is" means "equals." The word "times" means "multiply."

3. Select the TWO equations that show 42 is 7 times as many as 6.

Ⓐ 6 × 42 = 7
Ⓑ 7 × 42 = 6
Ⓒ 42 = 7 × 6
Ⓓ 42 × 7 = 6
Ⓔ 7 × 6 = 42

4. Tom has 6 times as many baseball cards as Jill. If Jill has 8 baseball cards, how many does Tom have?

Which equation could be used to solve the problem?

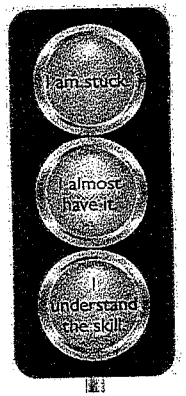
Ⓐ 8 − 6 = 2
Ⓑ 6 × 8 = 48
Ⓒ 6 + 8 = 14
Ⓓ 2 × 8 = 16

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TURN AND TALK

Work with a partner. Write a statement about a real-world situation that can be represented by the equation 15 × 4 feet = 60 feet.

Color in the traffic signal that shows how you are doing with the skill.



How Am I Doing?

What questions do you have?

How does multiplication make counting easier?

Why does order not matter when you multiply two numbers?

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INDEPENDENT PRACTICE

Answer the questions.

1. Which number correctly completes the statement?

   15 is 3 times as many as ____.

   (A) 4
   (B) 5
   (C) 8
   (D) 12

THINK ABOUT IT

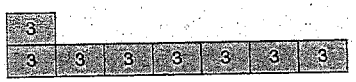
A comparison can be written using a multiplication equation. Think: 15 = 3 × ?.

2. What number is 2 times as many as 10?

   Write your answer in the box.

   20

3. Select the TWO equations that represent the model below.



   (A) 7 × 21 = 3
   (B) 21 = 3 × 7
   (C) 7 × 3 = 21
   (D) 3 = 21 × 7

HINT, HINT

Bar models show how much greater one number is than another number.

4. Which equation shows that 35 is 7 times greater than 5?

   (A) 5 × 7 = 35
   (B) 35 × 7 = 5
   (C) 7 = 35 × 5
   (D) 5 × 35 = 7

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WORK SPACE

5. Chen is growing vegetable plants. His bean plant is 6 centimeters tall. His tomato plant is 5 times as tall as his bean plant. Which TWO equations show the height of the tomato plant?

Ⓐ $30 \times 5 = 6$
Ⓑ $6 = 5 \times 30$
Ⓒ $30 = 5 \times 6$
Ⓓ $30 \times 6 = 5$
Ⓔ $6 \times 5 = 30$

6. India's aunt is 4 times older than India. India is 6 years old. Write and solve an equation to show how old India's aunt is.

Sample answer: $6 \times 4 = 24$. India's aunt is 24 years old.

7. Part A

Jack has a piece of red ribbon that is two times as long as his piece of blue ribbon. He says that he can use two different equations to find out how long his piece of red ribbon is compared to his piece of blue ribbon. Is he correct? Explain your reasoning.

Sample answer: Yes, Jack is correct. The numbers can be multiplied in any order.

Part B

Jack's piece of blue ribbon is 9 centimeters long. Write and solve an equation to find the length of his red ribbon.

Sample answer: $2 \times 9 = 18$
Jack's piece of red ribbon is 18 centimeters long.

▶ SKETCH IT

To help visualize the problem, draw a model of the two pieces of ribbon.

8. Write a short story problem that could be solved using the equation:

$24 = 8 \times 3$

Sample answer: Wendy has 3 marbles and Dave has 8 times as many marbles as Wendy. How many marbles does Dave have?

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EXIT TICKET

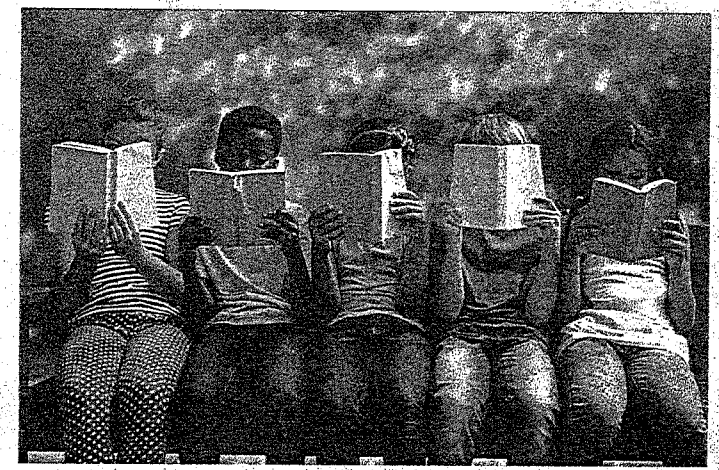
4.OA.1, 4.OA.1a, 4.OA.1b

Now that you have mastered reading and writing multiplication equations, let's solve the problem in the Real-World Connection.

Greta and Lance are competing in a book-reading challenge. The winner receives a gift certificate to purchase monthly e-books for one year. So far, Greta has read 8 books. Lance has read 5 times as many books as Greta. How many books has Lance read? Write an equation that will help you solve the problem.

Equation: $8 \times 5 = 40$

Lance has read 40 books.



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GUIDED INSTRUCTION

THINK ABOUT IT

Once you find that 2 is not a factor, how do you know that other even numbers are not factors?

1. Find the factor pairs of 21.

Step One Try each number in order to see if it is a factor.

- 1 is always a factor.

  $1 \times 21 = 21$

- 2 and any even number will not be a factor because 21 is an odd number.
- 3 works: 3×7

  $3 \times 7 = 21$

- 5 will not be a factor because 21 does not end in 0 or 5.
- 7 has already been found as a factor, so you can stop.

Step Two List the factors you have found.

21 is a multiple of 1, 3, 7, and 21.

The factor pairs of 21 are:

- 1, 21
- 3, 7

2. Is 27 prime or composite?

Step One Start by finding factors of 27.

Think: What two numbers can I multiply to get 27?

$1 \times 27 = 27$

$3 \times 9 = 27$

Step Two If 27 has more than 2 factors, it is a composite number.

There are more than 2 factors.

27 is a composite number.

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3. Find the first four multiples of 4. Are these numbers prime or composite?

Step One Multiply by 4, starting with 1.

Or, count by 4s.

$4 \times 1 = 4$

$4 \times 2 = 8$

$4 \times 3 = 12$

$4 \times 4 = 16$

Step Two Ask yourself if the numbers have more than 2 factors.

The first four whole number multiples of 4 are 4, 8, 12, and 16.

All of these numbers are composite because they have factors other than 1 and themselves.

4. Select THREE of the following that are composite numbers.

Ⓐ 3

Ⓑ 6

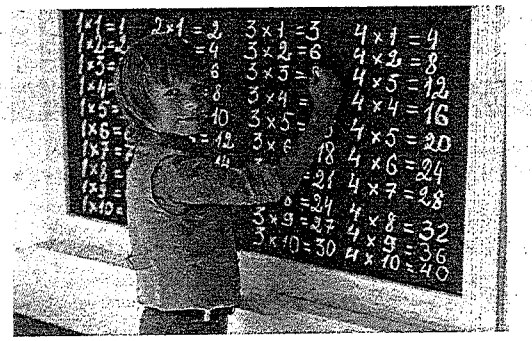
Ⓒ 10

Ⓓ 17

Ⓔ 22

HINT, HINT

Look for whole numbers greater than 1 with more than two factors.



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TURN AND TALK

Work with a partner to solve this: Howie is organizing a collection of bobble heads on shelves. He has fewer than 40 bobble heads. One shelf is not large enough to hold all of his collection. If Howie uses 2, 3, 4, 6, or 8 shelves, he can put an equal number of bobble heads on each shelf. How many bobble heads does Howie have? Show how you found your answer.

Color in the traffic signal that shows how you are doing with the skill.



How Am I Doing?

What questions do you have?

What is one way to find a number's factors?

How could you use your knowledge of factors and multiples in real life?

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INDEPENDENT PRACTICE

Answer the questions.

1. Write the numbers in the box to complete the factor pairs of 20.

   1, 20 , 4 , 5 , 2 , 10

2. Find the missing factor of 36. Write the answer in the box.

   1, 2, 3, 4, 6 , 9, 12, 18, 36

3. Which of the following is a prime number?

   Ⓐ 18
   Ⓑ 30
   Ⓒ 41
   Ⓓ 50

HINT, HINT

Prime numbers only have two factors, or one factor pair.

4. Which of the following is a composite number?

   Ⓐ 2
   Ⓑ 14
   Ⓒ 19
   Ⓓ 23

SKETCH IT

You can draw arrays to help you find factor pairs.

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WORK SPACE

5. Select THREE of the following that are multiples of 4.

Ⓐ 1
Ⓑ 6
Ⓒ 9
Ⓓ 24
Ⓔ 28
Ⓕ 36

6. Select THREE of the following numbers that are factor pairs of 72.

Ⓐ 2 and 38
Ⓑ 3 and 24
Ⓒ 4 and 18
Ⓓ 5 and 15
Ⓔ 6 and 12

Eddie says that the only even prime number is 2. Is he correct? Explain your reasoning.

Sample answer: Yes, he is correct. 2 is a prime number because it only has two factors: 1 and 2. All other even numbers have more than two factors.

8. Part A

Ling listed all of the factors of a mystery number: 1, 2, 4, 8, 16, 32. What is the mystery number?

32

Part B

Explain how you found your answer to Part A.

Sample answer: I saw that 1 and 32 were a factor pair, and 32 was the greatest factor. So, $1 \times 32 = 32$.

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EXIT TICKET

4.OA.4

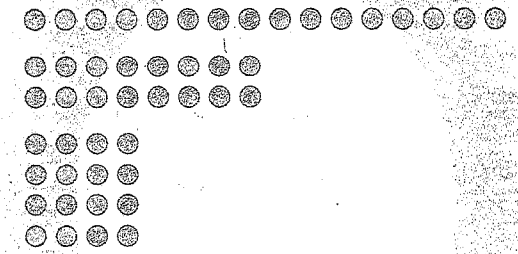
Now that you have mastered finding factors and multiples, let's solve the problem in the Real-World Connection.

Simon is opening a bakery. He wants boxes to hold 16 muffins. Simon wonders how to arrange the muffins in rows and how many muffins should go in each row in each box.

How many ways can Simon arrange the 16 muffins?

Use factor pairs to see how many ways Simon can arrange the muffins.

Simon can arrange the muffins 3 different ways.



The factor pairs of 16 are: 1 and 16, 2 and 8, and 4 and 4.

Simon can arrange the muffins in 1 row of 16, 2 rows of 8, or 4 rows of 4.

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HINT, HINT

The three dots (called ellipsis) mean, "continue in this pattern".

TURN AND TALK

How would the pattern change if you added 3 instead of subtracted 3?

EXAMPLE

What is the 15th term in the pattern?

2, 7, 12, 17, ...

Step One Find the rule of the pattern.

The rule for this pattern is: start with 2 and add 5. The first term is 2. Add 5 to the first term to get the second term, 7. The second term also can be found using the rule $(5 \times 2) - 3$.

Step Two Use a table to see if the same rule can be applied to all of the terms.

1st term	2	$(5 \times 1) - 3$
2nd term	7	$(5 \times 2) - 3$
3rd term	12	$(5 \times 3) - 3$
4th term	17	$(5 \times 4) - 3$

The same rule can be used to find any term in the pattern.

Step Three Find a rule that can be applied to any term.

$(5 \times \square) - 3$, where $\square$ is the number of the position of the term.

Step Four Use the rule to find the 15th term of the pattern.

$(5 \times 15) - 3 = 72$

Look at some of the features of the pattern. The odd-numbered terms (1st term, 3rd term, and so on) have a 2 in the ones place. Also, the tens place increases by 1 for every odd-numbered term. Even-numbered terms have a 7 in the ones place. The tens place increases by 1 for every even-numbered term.

GUIDED INSTRUCTION

1. Identify the rule that creates the pattern 4, 5, 7, 10, 14, ... Find the 6th term.

Step One Look at the first few terms of the pattern.

The terms do not repeat, so it is not a repeating pattern.

The numbers are increasing, so it is a [growing] pattern.

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Step Two Look at how the pattern changes.

The 2nd term is 1 more than the 1st term. The 3rd term is 2 more than the 2nd term. The 4th term is 3 more than the 3rd term. The 5th term is 4 more than the 4th term.

Step Three Find the rule.

The rule for the pattern is that the amount added to each term goes up by 1 each time.

Step Four Find the 6th term.

The 6th term is 5 more than the 5th term,

so the 6th term is [19].

TURN AND TALK

What are the 7th, 8th, and 9th terms in the pattern?

2. Create a pattern that starts with 5. To get to the next term, multiply by 2, then add 3. Stop when you have five numbers.

Step One Identify the first term.

The first term is [5].

Step Two Write a rule to find each term.

$(\square \times 2) + 3$

Step Three Find each term in the pattern.

$(5 \times 2) + 3 = 13$

$(13 \times 2) + 3 =$ [29]

([29] $\times 2) + 3 =$ [61]

([61] $\times 2) + 3 =$ [125]

Step Four Write the pattern.

The first 5 terms of the pattern are:

[5, 13, 29, 61, 125]

TURN AND TALK

Why are all the terms odd?

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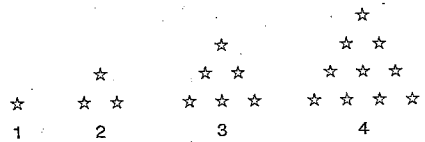
HINT, HINT

Try replacing the 15 with a 1 in the answer choices and seeing if it results in the first term.

3. Which rule can help find the 15th term of the pattern shown?
75, 70, 65, 60, 55, . . .
Select TWO answers.

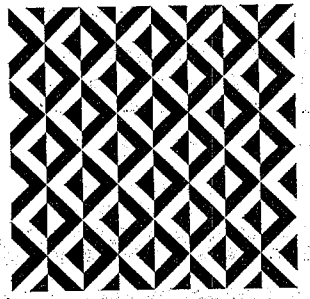
(A) add 5
(B) subtract 5
(C) $80 - (5 \times 15)$
(D) $(5 \times 15) + 80$
(E) $(5 \times 15) + 75$

4. How many stars are in the 5th and 6th figures of the pattern shown?



(A) 14 and 18
(B) 14 and 19
(C) 15 and 20
(D) 15 and 21

Patterns made of lines and shapes are called geometric patterns. Geometric patterns can be found art and architecture.



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How Am I Doing?

What questions do you have?

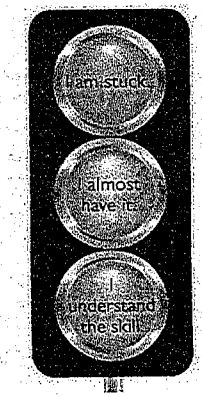
How can you tell if a pattern is growing or shrinking?

What is an example of a pattern of shapes you see around the room? Do you see a pattern in the floor tiles or carpet?

SKETCH IT

On a separate sheet of paper, draw a pattern of flying birds. Draw the third, fourth, and fifth terms only. Switch paper with a partner and have the partner write the rule for your pattern. Then have your partner draw the first and second terms. Check you partner's work and help him or her to understand the rule for your pattern if there are mistakes.

Color in the traffic signal that shows how you are doing with the skill.



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INDEPENDENT PRACTICE

Answer the questions.

▶ HINT, HINT

Check all of the terms of each pattern. Every term must follow the rule.

WORK SPACE

1. Which pattern starts at 60 and subtracts 4 to find the next term?

   (A) 60, 56, 52, 48, 44, 40
   (B) 60, 56, 50, 46, 42, 38
   (C) 60, 64, 68, 72, 76, 80
   (D) 60, 54, 50, 56, 60, 64

2. Which number correctly completes the pattern?

   Rule: Multiply by 3, then subtract 2.

   5, 13, _____, 109, 325, . . .

   (A) 14
   (B) 27
   (C) 37
   (D) 41

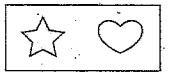
3. The rule is: start at 80, then subtract 4. Select THREE of the numbers that belong to the pattern that follows the rule.

   (A) 78
   (B) 68
   (C) 56
   (D) 50
   (E) 44

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4. Use the shapes in the box to complete the pattern.

   Shapes can be used more than once. Draw each shape on the appropriate line.





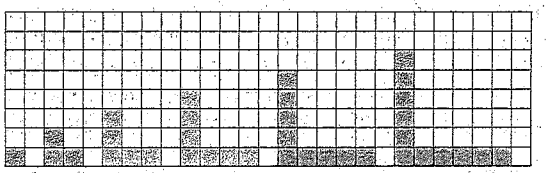
5. Which of the patterns is a repeating pattern?

   (A) OXXOXOOX
   (B) XYZXXYZY
   (C) KGLHKGLH
   (D) PKSTKSTP

6. Which rule can be used to generate the pattern: 1, 2, 4, 7, 11, 16, . . .?

   (A) Each number is multiplied by 2.
   (B) Each number is increased by 3.
   (C) The amount added to each number increases by 1 each time.
   (D) The amount added to each number increases by 2 each time.

7. Use the grid to draw the two missing shapes in the pattern shown.



WORK SPACE

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WORK SPACE

8. Part A

What are the next 5 digits of the pattern: 5114551145511455?

Write your answer in the box.

11455

Part B

Explain how you found the next 5 digits of the pattern in Part A.

Sample answer: The pattern is a repeating pattern. 51145 is the core that repeats. The next 5 digits of the pattern are 11455, because the first 5 of the pattern is already written.

9 Part A

Find the rule to complete the table.

Write your answers in the boxes.

1st term	3
2nd term	5
3rd term	7
4th term	9
5th term	11
6th term	13

Part B

What is the rule used in Part A? Identify two features of the pattern. Explain your answer.

Sample answer: The rule used is: multiply the number of the term by 2, then add 1: (☐ × 2) + 1. Multiplying the number of the term, ☐, by 2 makes every term in the pattern increase by 2. Adding 1 makes the terms odd numbers.

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EXIT TICKET

4.OA.5

Now that you have mastered representing writing and adding on to patterns, let's solve the problem in the Real-World Connection.

Jared counted the chairs in the media room. He counted 3 chairs in the first row, 5 chairs in the second row, and 7 chairs in the third row. The room has a total of 12 rows. How many people can sit in the 12th row of the media room?

Identify the pattern and find a rule for the pattern. Fill in the table to help solve the problem.

Row	Term	Number of Chairs	Pattern
Row 1	1st term	3	(1 × 2) + 1
Row 2	2nd term	5	(2 × 2) + 1
Row 3	3rd term	7	(3 × 2) + 1

Rule: (☐ × 2) + 1

Number of people who can sit in the 12th row: 25

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PRACTICE TEST

CHAPTER 1

Answer the questions.

1. What is the standard form of the number five hundred twenty-three thousand, six hundred one?

   Write your answer in the box.

   523,601

2. Compare the numbers. Write the symbol in the box that correctly completes the statement.

   145,892 [>] 100,000 + 40,000 + 5,000 + 700 + 90 + 2

3. What are TWO other ways to write the number two hundred fifty-five thousand, one hundred two?

   (A) 25,512
   (B) 255,002
   (C) 200,000 + 50,000 + 5,000 + 100 + 2
   (D) 200,000 + 50,000 + 5,000 + 100 + 50 + 2
   (E) 10,000 + 5,000 + 6,000 + 100 + 2
   (F) 255,102

4. What is 78,316 rounded to the nearest hundred?

   Write your answer in the box.

   78,300

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5. Select the TWO statements that are true.

   (A) 673 rounded to the nearest ten is 670.
   (B) 105 rounded to the nearest hundred is 200.
   (C) 3,438 rounded to the nearest ten is 3,400.
   (D) 26,509 rounded to the nearest ten thousand is 30,000.
   (E) 508,497 rounded to the nearest hundred thousand is 510,000.
   (F) 817,365 rounded to the nearest ten is 817,360.

6. Circle the word that correctly completes the statement.

   42,928 rounded to the nearest _____ is 43,000.

   (A) ten
   (B) hundred
   (C) thousand
   (D) ten thousand

7. Horatio and Whitney just started collecting stamps. Horatio has 9 times as many stamps as Whitney. Whitney has 5 stamps. Write and solve an equation to show how many stamps Horatio has.

   Sample answer: $9 \times 5 = 45$. Horatio has 45 stamps.

8. It costs $6 for a ticket to a soccer game. It costs 3 times as much for a ticket to a baseball game. Which equations show the cost of a ticket to a baseball game? Select TWO answers.

   (A) $18 \times 3 = 6$
   (B) $18 = 3 \times 6$
   (C) $6 \times 18 = 3$
   (D) $18 \times 3 = 6$
   (E) $18 = 6 \times 3$
   (F) $3 \times 18 = 6$

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9. Which number correctly completes the statement?

25 is 5 times as many as _____.

Ⓐ 4
Ⓑ 5
Ⓒ 10
Ⓓ 15

10. Part A

Corey has a piece of teak wood that is three times as long as his piece of oak wood. He says that he can use two different equations to find out how long his piece of teak wood is compared to his piece of oak wood. Is he correct? Explain your reasoning.

Sample answer: Yes, Corey is correct. The numbers can be multiplied in any order.

Part B

Corey's piece of oak wood is 8 inches long. Write and solve an equation to find the length of his teak wood piece.

Sample answer: $3 \times 8 = 24$
Corey's piece of teak wood is 24 inches long.

11. List all of the factor pairs of 42.

1. 42 2. 21 3. 14 6. 7

12. Select THREE of the following that are multiples of 7.

Ⓐ 14
Ⓑ 19
Ⓒ 20
Ⓓ 42
Ⓔ 70
Ⓕ 72

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13. Part A

Sarah listed all of the factors of a mystery number: 1, 2, 3, 4, 6, 8, 12, 16, 24, 48.
What is the mystery number?

48

Part B

Explain how you found your answer to Part A.

Sample answer: I saw that 1 and 48 were a factor pair, and 48 was the greatest factor. So, $1 \times 48 = 48$.

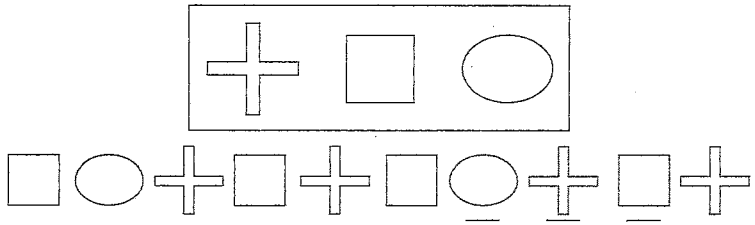
14. Explain how to find the rule to find the 30th term of the pattern.
8, 11, 14, 17, 20, 23, . . .

Sample answer: I found the 2nd term by using the rule $(3 \times 2) + 5 = 11$. I made a table to see if the rule works for every term. Using the rule, the 30th term of the sequence is $(3 \times 30) + 5 = 95$.

15. Use the shapes in the box to complete the pattern.

The shapes cannot be used more than once.

Draw each shape on the correct line.



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HINT, HINT

Cross out the number you are borrowing from, and write the regrouped number above the previous column.

EXAMPLE

Subtract 237 − 194.

Step One Subtract the digits in the ones place:
7 − 4 = 3

- Write the 3 in the ones column as the difference.

Step Two Subtract the digits in the tens place:

- Regroup 1 hundred as 10 tens.
- There are now 13 tens and 1 hundred.
- Subtract: 13 tens − 9 tens = 4 tens

	Hundreds	Tens	Ones
	1	13	
	~~2~~	~~3~~	7
−	1	9	4
		4	3

Step Three Subtract the digits in the hundreds place:

- 1 hundred − 1 hundred = 0 hundreds

Step Four Write the difference: 237 − 194 = 43

GUIDED INSTRUCTION

1. Find the sum: 4,836 + 7,549
Use the place-value chart to help you regroup as you add.
Write each digit in its proper place.

Step One Add the ones.

	Thousands	Hundreds	Tens	Ones
			1	
	4	8	3	6
+	7	5	4	9
				5

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Step Two Add the tens.

	Thousands	Hundreds	Tens	Ones
			1	
	4	8	3	6
+	7	5	4	9
			8	5

Step Three Add the hundreds and thousands.

	Thousands	Hundreds	Tens	Ones
1	1		1	
	4	8	3	6
+	7	5	4	9
1	2	3	8	5

Step Four Write the answer.

4,836 + 7,549 = 12,385

2. Find the difference: 5,027 − 3,819

Step One Regroup to subtract the ones.

			1	17
	5,	0	~~2~~	~~7~~
−	3,	8	1	9
				8

Step Two Subtract the tens.

			1	17
	5,	0	~~2~~	~~7~~
−	3,	8	1	9
			0	8

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Step Three Regroup to subtract the hundreds.

$$\begin{array}{r} {\scriptstyle 4\ \ 10\ \ 1\ \ 17} \\ 5\ \ 0\ \ 2\ \ 7 \\ -\ 3\ \ 8\ \ 1\ \ 9 \\ \hline 2\ \ 0\ \ 8 \end{array}$$

Step Four Subtract the thousands.

$$\begin{array}{r} {\scriptstyle 4\ \ 10\ \ 1\ \ 17} \\ 5\ \ 0\ \ 2\ \ 7 \\ -\ 3\ \ 8\ \ 1\ \ 9 \\ \hline 1\ \ 2\ \ 0\ \ 8 \end{array}$$

Step Five Write the answer. $5{,}027 - 3{,}819 = 1{,}208$

TIPS AND TRICKS

Use pencil and paper to write each step of the addition. You are less likely to make a mistake and it is easier to check your work.

3. Select the TWO choices that show a correct way to add 793 + 268.

Ⓐ
$$\begin{array}{r} 7\ 9\ 3 \\ +\ 2\ 6\ 8 \\ \hline 9\ 5\ 1 \end{array}$$

Ⓑ
$$\begin{array}{r} 7\ 9\ 3 \\ +\ 2\ 6\ 8 \\ \hline 1\ 1 \\ 1\ 5\ 0 \\ 9\ 0\ 0 \\ \hline 1\ 0\ 6\ 1 \end{array}$$

Ⓒ
$$\begin{array}{r} 7\ 9\ 3 \\ +\ 2\ 6\ 8 \\ \hline 1\ 1 \\ 1\ 5 \\ 9\ 0\ 0 \\ \hline 9\ 2\ 6 \end{array}$$

Ⓓ
$$\begin{array}{r} {\scriptstyle 1\ \ 1\ \ \ \ } \\ 7\ 9\ 3 \\ +\ 2\ 6\ 8 \\ \hline 9\ 5\ 1 \end{array}$$

Ⓔ
$$\begin{array}{r} {\scriptstyle 1\ \ 1\ \ \ \ } \\ 7\ 9\ 3 \\ +\ 2\ 6\ 8 \\ \hline 1\ 0\ 6\ 1 \end{array}$$

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How Am I Doing?

What questions do you have?

Choose two large numbers. How can you add and subtract these numbers?

What are some examples of multi-digit numbers that you add or subtract at home?

TURN AND TALK

Discuss with a partner. Amber found the difference of 8,657 − 7,354 as 1,303. Do you agree with her calculation? If so, why? If not, explain the error she made.

Color in the traffic signal that shows how you are doing with the skill.



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WORK SPACE

INDEPENDENT PRACTICE

Answer the questions.

1. Find the difference.

   4,310 − 2,654

   (A) 1,656
   (B) 2,344
   (C) 2,766
   (D) 7,064

2. Which pairs of numbers have a sum of 483? Select THREE answers.

   (A) 226 and 257
   (B) 114 and 379
   (C) 252 and 121
   (D) 152 and 331
   (E) 235 and 258
   (F) 394 and 89

3. Timothy is adding 941 and 875. Which shows his next step?

$$\begin{array}{r} 941 \\ +\ 875 \\ \hline 6 \end{array}$$

   (A) Write 1 in the tens place in the sum and 7 in the hundreds place.
   (B) Write 7 in the hundreds place in the sum and 1 in the top of the thousands place.
   (C) Write 1 in the tens place in the sum and 1 in the top of the hundreds place.
   (D) Write 11 in the tens place in the sum and 17 in the hundreds place.

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4. Find each answer.

216 + 75 =	291
297 − 38 =	259
2,684 − 2,473 =	211
142 + 125 =	267

5. Midtown Elementary School has 476 students coming back for this school year. There are 87 additional new students this year. Which shows the number of students in the school now?

   (A) 389
   (B) 463
   (C) 563
   (D) 553

6. What is 8,953 + 658?

   Write your answer in the box.

   9,611

Use the numbers in the box to complete the addition problem.

The numbers cannot be used more than once. Write each number in the correct box.

1	2	6	8	9

$$\begin{array}{r} {\scriptstyle 1\ \ 1\ \ \ } \\ 9\ 5\ 6 \\ +\ 2\ 8\ 5 \\ \hline 1\ 2\ 4\ 1 \end{array}$$

WORK SPACE

TIPS AND TRICKS

Try more than one strategy to find the sum. Each strategy should have the same answer. Using more than one strategy is great way to check your work.

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TIPS AND TRICKS

Make sure to read how many answers are required (1, 2, or 3) and select the correct number of answers.

WORK SPACE

8 Which pairs of numbers have a difference of 271? Select THREE answers.

- (A) 623 and 494
- (B) 1,000 and 729
- (C) 24,138 and 23,867
- (D) 3,147 and 2,976
- (E) 984 and 713
- (F) 398 and 71

9. Part A

Find the difference.

$$\begin{array}{r} 894 \\ -\ 596 \\ \hline \end{array}$$

Write your answer in the box.

298

Part B

How did you find the difference in Part A? Explain your answer.

Sample answer: I started with the ones. I did not have enough ones to subtract 6, so I had to regroup 1 ten giving 14 ones and 8 tens. 14 − 6 = 8. The difference has 8 in the ones place. Then, I regrouped 1 hundred as 10 tens and found 18 − 9 = 9. Last, I subtracted the hundreds: 7 − 5 = 2. So, 894 − 596 = 298.

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EXIT TICKET

4.NBT.4

Now that you have mastered adding and subtracting multi-digit numbers, let's solve the problem in the Real-World Connection.

Blake's family is going on vacation. They begin their trip by driving 634 miles from Lexington, Kentucky to Philadelphia, Pennsylvania. They drive another 139 miles to Washington, D.C. Then, they drive 536 miles to go back home. How many miles do they drive in all?

Blake's family drives 1,309 miles.

	Thousands	Hundreds	Tens	Ones
	1	1	1	
		6	3	4
		1	3	9
+		5	3	6
	1	3	0	9

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Step Three Find all the partial products.

1200 + 360 + 150 + 45

Step Four Find the sum of the partial products.

1,755

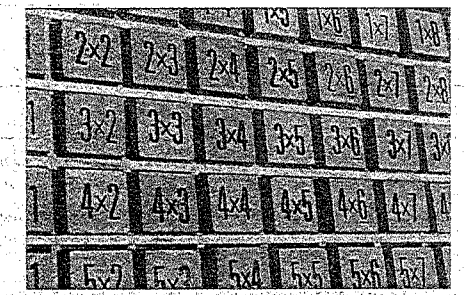
Method Two Use a picture to help organize the partial products.

	40	5
30	30 × 40 = 1200	30 × 5 = 150
9	9 × 40 = 360	9 × 5 = 45

Add the partial products: 1200 + 150 + 360 + 45 = 1,755

Method Three Write the products vertically, in an up-and-down direction. Then add.

```
  4 5
× 3 9
-----
  4 5   9 × 5
3 6 0   9 × 40
1 5 0   30 × 5
+1 2 0 0   30 × 40
-------
1 7 5 5
```



THINK ABOUT IT

Which method do you like the best? Why?

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GUIDED INSTRUCTION

1. Find 6417 × 4.

Step One 4 × 7 = 28

```
  6 4 1 7
×       4
-------
      2 8
```

Step Two 4 × 10 = 40

```
  6 4 1 7
×       4
-------
    2 8
    4 0
```

Step Three 4 × 400 = 1,600

```
  6 4 1 7
×       4
-------
    2 8
    4 0
1 6 0 0
```

Step Four 4 × 6,000 = 24,000

```
  6 4 1 7
×       4
-------
    2 8
    4 0
1 6 0 0
2 4 0 0 0
```

Step Five Add the partial products.

6,417 × 4 = 25,668

```
  6 4 1 7
×       4
-------
    2 8
    4 0
1 6 0 0
+ 2 4 0 0 0
---------
2 5 6 6 8
```

TURN AND TALK

Will there always be one more zero in the next row?

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HINT, HINT

As you multiply, pay attention to place value. You are not just multiplying ones. It is important to keep track of the value of each digit.

2. Use the numbers in the box to show the partial products. Then find the final product by adding the partial products.

The numbers cannot be used more than once. You will not use every number. Write each number in the appropriate box.

25	250	40	400	4,000	64	640

$$\begin{array}{r} 85 \\ \times\ 58 \\ \hline \end{array}$$

40	8 × 5
640	8 × 8 tens
250	5 tens × 5
4,000	5 tens × 8 tens
4,930	

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How Am I Doing?

What questions do you have?

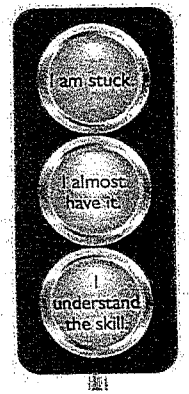
When does a cash register at a grocery store use multiplication?

How do you decide which method to use when multiplying?

TURN AND TALK

Travis drives 43 miles one way to work every day. Work with a partner to write an equation to show the number of miles he drives round trip from home to work and back. How many total miles does he drive if he works five days per week? Explain your method for solving the problem.

Color in the traffic signal that shows how you are doing with the skill.



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INDEPENDENT PRACTICE

Answer the questions.

1. Write your answer in the box.

$$\begin{array}{r} 5324 \\ \times \quad 2 \\ \hline 10{,}648 \end{array}$$

TIPS AND TRICKS

Use the Distributive Property to multiply by a sum.

2. Which of the following can be used to find 5×281?

(A) $5 \times 200 \times 80 \times 1$

(B) $(5 + 200) \times (5 + 80) \times (5 + 1)$

(C) $(5 + 200) + (5 + 80) + (5 + 1)$

(D) $5 \times 200 + 5 \times 80 + 5 \times 1$

3. Write your answer in the box.

$$\begin{array}{r} 81 \\ \times \quad 60 \\ \hline 4{,}860 \end{array}$$

HINT, HINT

Keep place value in mind when finding the partial products.

4. Write the partial products and then add them to find 797×8. Write your answers in the boxes.

$$\begin{array}{r} 797 \\ \times \quad 8 \\ \hline 56 \\ 720 \\ + \quad 5600 \\ \hline 6{,}376 \end{array}$$

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5. Find each product.

$42 \times 11 =$	462
$315 \times 6 =$	1,890
$71 \times 32 =$	2,272
$2{,}431 \times 2 =$	4,862
$648 \times 5 =$	3,240

6. Which of the following show partial products for 26×14? Select THREE answers.

(A) 1×6

(B) 10×20

(C) 10×6

(D) 4×6

(E) 2×4

TIPS AND TRICKS

Draw a picture to help you organize the partial products.

7. Part A

Heather is finding 93×26. Her work is shown here.

	9	3
2	18	6
6	54	18

Heather has made a mistake. Explain what she has done wrong.

Sample answer: Heather has set up the problem correctly, but she did not consider place value. 93 is 90 and 3, not 9 and 3, and 26 is 20 and 6, not 2 and 6.

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WORK SPACE

Part B

Use Heather's method correctly to find 93 × 26. Draw the correct picture and add the partial products to find the solution to 93 × 26.

	90	3
20	1800	60
6	540	18

Sample answer: I used Heather's method to organize my partial products.
So 93 × 26 = 1800 + 540 + 60 + 18 = 2418.

8 Complete the product by writing the correct numbers in the boxes. The numbers cannot be used more than once.

1	2	3	4	5

```
   8 2 5 9
 ×       6
 -------
       5 4
     3 0 0
   1 2 0 0
+ 4 8 0 0 0
 -------
 4 9 5 5 4
```


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EXIT TICKET

4.NBT.5

Now that you have mastered multiplying, let's solve the problem in the Real-World Connection.

There are 32 classrooms at Northridge Elementary School. Each classroom can fit up to 18 students. How many students can attend Northridge Elementary School?

576 students can attend Northridge Elementary School.

```
   3 2
 × 1 8
 -----
   1 6
 2 4 0
   2 0
+ 3 0 0
 -----
 5 7 6
```

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THINK ABOUT IT

What if the sum of the remainders added to more than the divisor?

EXAMPLE

What is 132 ÷ 7?

Step One Use place values to break apart the dividend into hundreds, tens, and ones.

- 132 = 1 hundred + 3 tens + 2 ones

Step Two Divide each part of the dividend by the divisor.

- 100 ÷ 7 = 14 R2
- 30 ÷ 7 = 4 R2
- 2 ÷ 7 = 0 R2

Step Three Add the quotients and the remainders separately.

- Quotients: 14 + 4 + 0 = 18
- Remainders: 2 + 2 + 2 = 6

So, 132 ÷ 7 = 18 R6.

GUIDED INSTRUCTION

1. Divide 7,201 by 3.

$$3\overline{)7{,}201}$$

Step One Find a multiple of the divisor that is closest to the dividend. The divisor is 3 and the dividend is 7,201.

3 × 1,000 = 3,000... too small

3 × 2,000 = 6,000... close to 7,201

3 × 3,000 = 9,000... too large

Step Two Multiply 3 by 2,000 and subtract it from the dividend.

The difference is [1,201].

$$3\overline{)7{,}201}$$
$$-\ 6{,}000 = 3 \times 2{,}000$$
$$\boxed{1{,}201}$$

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Step Three Think of multiples of 3 that are close to the difference.

3 × 300 = 900... too small

3 × 400 = 1,200... close to 1,201

3 × 500 = 1,500... too large

Step Four Multiply 3 by 400 and subtract it from 1,201.

The difference is [1].

$$3\overline{)7{,}201}$$
$$\underline{-\ 6{,}000 = 3 \times 2{,}000}$$
$$1{,}201$$
$$\underline{-\ 1{,}200 = 3 \times 400}$$
$$\boxed{1}$$

Step Five Add the factors of the divisor to find the quotient and write what is left over as the remainder.

[2,000] + [400] = [2,400]

with a remainder of [1]

7,207 ÷ 3 = [2,400 R1]

[2,400 R1] = 2,000 + 400 + R1

$$3\overline{)7{,}201 = 6{,}000 + 1{,}200 + 1}$$
$$\underline{-\ 6{,}000 = 3 \times 2{,}000}$$
$$1{,}201$$
$$\underline{-\ 1{,}200 = 3 \times 400}$$
$$1$$

TURN AND TALK

How can you check your answer?

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TURN AND TALK

William had 384 pennies. He exchanged them for nickels at the bank. How many nickels did William receive? How many pennies did he have left over? Explain your reasoning.

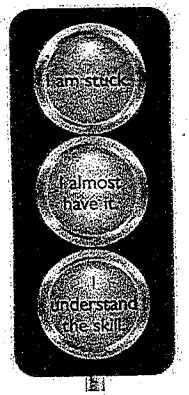
How Am I Doing?

What questions do you have?

What is the result of dividing the current year by your age?

How does division relate to multiplication?

Color in the traffic signal that shows how you are doing with the skill.



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INDEPENDENT PRACTICE

Answer the questions.

1. What is 892 ÷ 3?

   (A) 181 (B) 297 R1
   (C) 298 (D) 300 R8

TIPS AND TRICKS

You can use mental math and place value to rule out answer choices that are not correct. Eliminate answers that are incorrect. Then use calculation to find the correct answer.

2. Solve each problem. Select the quotient and write it in the correct box.

   The numbers cannot be used more than once.

234	133	483

   468 ÷ 2 = 234

   2,415 ÷ 5 = 483

   931 ÷ 7 = 133

3. There are 112 pretzels in a box of pretzels. If 4 friends divide them evenly, how many pretzels will each friend get?

   Write your answer in the box.

   28 pretzels

4. Gillian has 288 beads. She wants to make bracelets for 9 of her friends. If she uses all of the beads, how many beads will be on each bracelet?

   Which number correctly completes the statement?

   Each bracelet will have _____ beads.

   (A) 23 (B) 32
   (C) 297 (D) 2,592

HINT, HINT

When the question has a real-world context, check to make sure your answer makes sense for the context.

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WORK SPACE

5. What is 327 ÷ 6?

Write your answer in the box.

54 R3

6. Hannah has 78 inches of ribbon. She wants to make bows with the ribbon for 6 presents. How many inches of ribbon can she use for each bow?

Write your answer in the box.

13 inches

7. Which of the following are equal to 260 ÷ 4? Select TWO answers.

Ⓐ (20 × 4) + (6 × 4)

Ⓑ (200 ÷ 4) + (60 ÷ 4)

Ⓒ (2 + 4) × (60 ÷ 4)

Ⓓ 104

Ⓔ 65

Ⓕ 384

8. What is 1,415 ÷ 7?

Write your answer in the box.

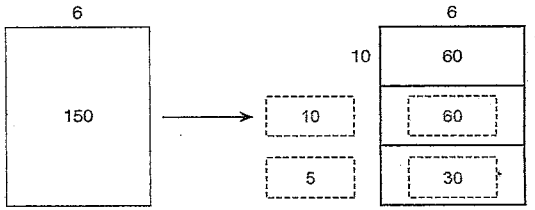
202 R1

TIPS AND TRICKS

To check your work in a division problem, you can multiply the quotient by the divisor and add the remainder. If the answer matches the dividend, then your answer is correct.

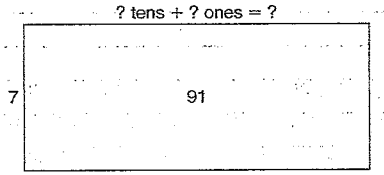
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9. Complete the diagram and the equation to find 150 ÷ 6. Write your answers in the boxes.

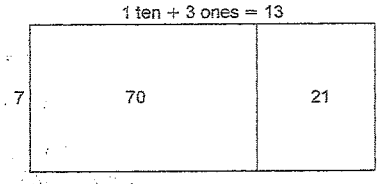


150 ÷ 6 = 10 + 10 + 5 = 25

10. A rectangle has an area of 91 square centimeters and a height of 7 centimeters. What is its length? Complete the equation below. Illustrate your answer with a drawing.



Sample answer: Its length is 13 cm.



WORK SPACE

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WORK SPACE

11. Part A

David hiked for 5 hours and burned 1,265 calories. How many calories did he burn each hour?

Write your answer in the box.

253 calories

Part B

Explain how you found your answer. Show your work.

Sample answer: To divide 1,265 by 5, I thought of a multiple of 5 that is close to the dividend, 1,265. 5 × 200 is 1,000. I subtracted that from 1,265. The difference was 265. I thought of a multiple of 5 that is close to 265. 5 × 50 is 250. I subtracted 250 from 265 to get 15. 5 × 3 = 15. I subtracted to get 0. Then I added the factors to find the quotient. 200 + 50 + 3 = 253. David burned 253 calories per hour.

$$\begin{array}{r} 253 = 200 + 50 + 3 \\ 5\overline{)1{,}265} = 1{,}000 + 250 + 15 \\ -1{,}000 = 5 \times 200 \\ \hline 265 \\ -250 = 5 \times 50 \\ \hline 15 \\ -15 = 5 \times 3 \\ \hline 0 \end{array}$$

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12. Mason divided 1,782 by 4 and got 447. His work is shown below.

$$\begin{array}{r} 447 = 400 + 40 + 5 + 2 \\ 4\overline{)1{,}782} = 1{,}600 + 160 + 20 \\ -1{,}600 = 4 \times 400 \\ \hline 182 \\ -160 = 4 \times 40 \\ \hline 22 \\ -20 = 4 \times 5 \\ \hline 2 \end{array}$$

Is Mason correct? If not, explain the error he made and write the correct answer.

Sample answer: Mason is not correct. He added the remainder to the quotient instead of writing it as a remainder. The correct answer is 445 R2.

TIPS AND TRICKS

When a question asks you to "spot the error," try solving the problem on your own first. Then, compare your work to the example to see if the answers match.

WORK SPACE

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EXIT TICKET

4.NBT.6

Now that you have mastered division with whole numbers, let's solve the problem in the Real-World Connection.

There are 117 students taking part in Sports Day. They will be divided into 9 teams. How many students will be on each team?

There 13 students on each team.

$$
\begin{array}{r}
13 \\
9\overline{)117} \\
-\ 9 \\
\hline
27 \\
-\ 27 \\
\hline
0
\end{array}
$$



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SKETCH IT

Draw a picture and write an equation to solve word problems. You can check your equation against your drawing to see if your answer makes sense.

HINT, HINT

"The cost of a book is 5 times the cost of a magazine" is the same as saying "the cost of a book divided by 5 is the cost of a magazine."

EXAMPLE

A baseball cap costs $6. A baseball shirt costs 3 times as much as the cap. How much does the shirt cost?

Step One Draw a model to represent the problem. Use 1 bar to represent the cost of a cap. The problem tells you that a shirt costs 3 times as much as a cap. Use 3 bars to represent the cost of a shirt.

Cap	$6

Shirt	$6	$6	$6

Step Two Write and solve an equation to solve the problem. Use letters to represent the numbers in the problem.

C = cost of baseball cap ($) S = cost of baseball shirt ($)

$S = C \times 3$

$S = \$6 \times 3$

$S = \$18$

Step Three Answer the question. The baseball shirt costs $18.

You can use division to solve a multiplicative comparison word problem.

EXAMPLE

A book costs $25. A book costs 5 times more than a magazine. How much does a magazine cost?

Step One Draw a model to represent the problem. Use letters to represent the numbers in the problem.

C = cost of book ($) M = cost of magazine ($)

$C = \$25$

Book:	1	2	3	4	5

Magazine:	M

Step Two Since you don't know how much the magazine costs, you need to divide the cost of a book by 5.

Write and solve an equation to solve the problem.

$M = C \div 5$

$M = \$25 \div 5$

$M = \$5$

Step Three Answer the question. A magazine costs $5.

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GUIDED INSTRUCTION



1. A rose garden has 4 times as many red roses as white roses. There are 95 white roses in the garden. How many red roses are there?

Step One Draw a model to represent the problem.

Red roses:	95	95	95	95

White roses:	95

Step Two Write an equation.

Use R for the number of red roses and W for the number of white roses.

$R = 4 \times W$

You are describing the relationship between the quantities. R is 4 times greater than W.

Step Three Replace the letters with the numbers that you know.

$R = 4 \times 95$

Step Four Solve the equation.

$R =$ 380

Step Five Answer the question.

There are 380 red roses in the garden.

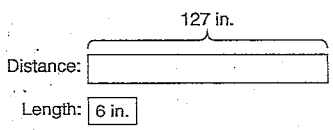
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2. A caterpillar is 6 inches long. It crawled 127 inches. About how many times its length did it crawl?

Step One Draw a model to represent the problem.



Step Two Write an equation.

$N = D \div L$

Use L for the length of the caterpillar. Use D for the distance it crawled. Use N for the number of times its length the caterpillar crawled.

Step Three Replace the letters with the numbers that you know.

$N = 127 \div$ 6

Step Four Solve the equation.

$N = 21$ R1 or $N = 21.1\overline{6}$

Step Five Interpret the answer.

The remainder is less than half of the divisor, so round the answer down.

The caterpillar crawled about 21 times its length.

HINT, HINT

The word "about" tells you that you should round your solution to the problem. You can use the remainder to tell if you should round up or down.

TURN AND TALK

Which pet eats more food-the puppy or the cat?

3. Fiona's puppy eats 6 times as much food per day as her cat eats. Fiona's puppy eats 545 grams of food per day. Select the TWO correct statements.

Use P for the amount of food the puppy eats, and C for the amount of food the cat eats.

Ⓐ $C = P + 6$

Ⓑ $P = 545$ grams

Ⓒ $P = 6 \times 545$ grams

Ⓓ $C = 545$ grams $\div 6$

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How Am I Doing?

What questions do you have?

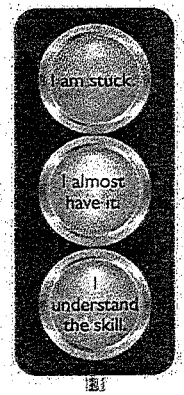
Explain the difference between multiplicative and additive comparisons.

Give an example of an additive comparison and an example of a multiplicative comparison.

TURN AND TALK

Solve with a partner. Salvatore can download 6 songs for $9. He spent $27. How many songs did Salvatore download? Show your work.

Color in the traffic signal that shows how you are doing with the skill.



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INDEPENDENT PRACTICE

Answer the questions.

1. Jill is 18 years old. Her sister is 3 years old. How many times older is Jill than her sister?

   Write your answer in the box.

   [6]

HINT, HINT

Read the problem and look for cues that tell you what operation you need to perform. "5 times as many" means you will need to multiply or divide.

2. A bakery sold 75 loaves of rye bread. The bakery sold one-third as many loaves of wheat bread as rye bread. How many loaves of wheat bread did the bakery sell?

   Which answer correctly completes the statement?

   The bakery sold _____ loaves of wheat bread.

   Ⓐ 3
   Ⓑ 25
   Ⓒ 75
   Ⓓ 78

3. Carson ran 7 miles. Howie ran 5 times as many miles as Carson. Select the THREE correct answers.

   Use C for the distance Carson ran, and H for the distance Howie ran.

   Ⓐ $H = 7$
   Ⓑ $H = C + 7$
   Ⓒ $H = 5 \times C$
   Ⓓ $C = 5 \div H$
   Ⓔ $H = 35$
   Ⓕ $C = 7$

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4. Which statement is true?

   Ⓐ 30 red buttons is 6 times as many buttons as 10 black buttons.
   Ⓑ 24 blue flowers is 4 times more flowers than 48 yellow flowers.
   Ⓒ Karen read 12 pages. Walt read 6 pages. Walt read twice as many pages as Karen.
   Ⓓ 69 minutes is 3 times as many minutes as 23 minutes.

5. A tile floor has 1,200 black tiles. There are 3 times more black tiles than white tiles. Select the TWO correct answers.

   Use B for the number of black tiles, and W for the number of white tiles.

   Ⓐ $W = 400$
   Ⓑ $W = 3$
   Ⓒ $W = 1{,}200 \div 3$
   Ⓓ $W = 1{,}200$
   Ⓔ $B + W = 1{,}200$
   Ⓕ $B + 3 = W$

6. Part A

   Quinn hiked 752 feet up a mountain. Derek hiked 2 times farther than Quinn. How far did Derek hike? Write your answer in the box.

   [1,504] feet

WORK SPACE

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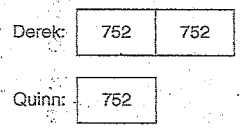
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WORK SPACE

Part B

Draw a picture and write equations to show how you found your answer to Part A.

Sample answer:



D is the distance Derek hiked.

Q is the distance Quinn hiked.

$D = 2 \times Q$

$D = 2 \times 752$

$D = 1{,}504$

A pie contains 2,907 calories. A pie contains 8 times more calories than a muffin. About how many calories does a muffin have?

Explain your answer using equations and words.

Sample answer: *A* muffin has about 363 calories.

P = calories in a pie. *M* = calories in a muffin.

$P \div 8 = M$

$2907 \div 8 = M$

$M = 363$ R3

The remainder is less than half of the divisor, so I rounded down.

There are about 363 calories in a muffin.

8. Aisha is shopping for a coat. She finds a blue coat for $39 and a black coat for $117. How many more times more does the black coat cost than the blue coat?

(A) 2 times
(B) 4 times
(C) 3 times
(D) 5 times

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EXIT TICKET

4.OA.2

Now that you have mastered multiplicative comparisons, let's solve the problem in the Real-World Connection.

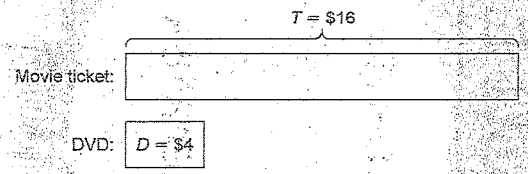
The cost of a movie ticket is $16. It costs $4 to rent a movie on DVD. How many times more does it cost to buy a movie ticket than it does to rent a movie on DVD?

Sample answer: It costs 4 times more to buy a movie ticket than it does to rent a DVD.

N = how many times it costs

T = the cost of a movie ticket

D = the cost of a DVD



Divide the cost of a movie ticket by the cost of a movie rental.

$N = T \div D$

$N = 16 \div 4$

$N = 4$

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THINK ABOUT IT

Multiply $\frac{1}{6}$ by $\frac{5}{5}$. Multiply $\frac{2}{5}$ by $\frac{6}{6}$.

Step Four Solve this equation to find the actual amount that he shared.

Add the fractions by finding a common multiple of 6 and 5.

$t = \left(\frac{1}{6} + \frac{2}{5}\right) \times 30$

$t = \left(\frac{5}{30} + \frac{12}{30}\right) \times 30$

$t = \left(\frac{17}{30}\right) \times 30$

$t = 17$

Ashton gave away 17 ounces of tuna salad.

Step Five Now find the amount that was left over.

Write the equation. Use r to represent the remaining tuna salad.

$r = 30 - t$

$r = 30 - 17$

$r =$ 13

Step Six Interpret the answer.

Ashton had 13 ounces of tuna salad left over.

HINT, HINT

Add the number of pounds of carrots and pounds of potatoes together, and then multiply by 3 to get the amount that Bill grew.

3. Johnny grew 58 pounds of carrots and 40 pounds of potatoes on his farm. Bill grew 3 times as many pounds of carrots and potatoes as Johnny. Bill sold half of his carrots and potatoes to a grocery store. How many pounds of vegetables did he sell?

Ⓐ 49

Ⓑ 107

Ⓒ 147

Ⓓ 294

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How Am I Doing?

What questions do you have?

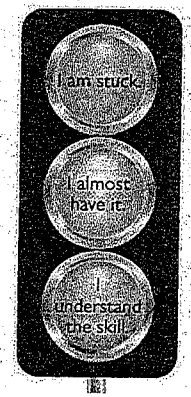
How do you decide which operations are needed to solve a multi-step problem?

What is an example of a multi-step problem that uses both multiplication and subtraction? How about both addition and division?

TURN AND TALK

Ebony has 6 packages of stickers. Each package has 8 stickers. She uses 12 stickers for each page in her scrapbook. Is it reasonable that Ebony can make 5 scrapbook pages from her stickers? Discuss with a partner. Use math to explain your answer.

Color in the traffic signal that shows how you are doing with the skill.



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WORK SPACE

INDEPENDENT PRACTICE

Answer the questions.

1. Nishka had $85 to shop for clothes. She bought 2 tops for $12 each, 3 pairs of leggings for $10 each, and a jacket for $25. How much money does Nishka have left to spend?

   Ⓐ $2
   Ⓑ $6
   Ⓒ $33
   Ⓓ $38

2. Bruce's mom has a budget of $550 to spend on his birthday party. The cost for a cake and decorations is $14 per child. The food will cost $3 for each child. The party favor bags will cost $7 per child.

   Which number correctly completes the statement?

   Bruce's mom can invite ____ children, including Bruce, to his party.

   Ⓐ 8
   Ⓑ 14
   Ⓒ 22
   Ⓓ 30

3. An ice cream company has 565 machines. 150 machines make vanilla ice cream. The rest of the machines make chocolate ice cream. 12 of the chocolate ice cream machines are out of order. Which number best estimates the number of chocolate ice cream machines that are working?

   Ⓐ 310
   Ⓑ 340
   Ⓒ 400
   Ⓓ 450

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4. Kelly has 26 coloring sheets and 26 sketching sheets. She wants to store an equal number of each type of sheet in 3 folders. How many sheets can Kelly store in each folder? Use x to represent the number of sheets in each folder.

   Use the numbers and variable in the box to complete the equation. Numbers can be used more than once. Write each symbol in the appropriate box to complete the equation for the problem.

3	26	x

   $$\boxed{x} = \frac{\boxed{26} + \boxed{26}}{\boxed{3}}$$

5. There are four restaurants on Main Street. One week, each restaurant served exactly 65 customers for lunch and 65 customers for dinner each day. How many customers visited a restaurant on Main Street that week? Choose the correct equation and solution.

   Ⓐ 910; $C = 65 \times 2 \times 7$
   Ⓑ 1,820; $C = (65 + 65) \times 2 \times 7$
   Ⓒ 3,640; $C = (65 + 65) \times 7 \times 4$
   Ⓓ 7,280; $C = (65 + 65) \times 7 \times 4 \times 2$

WORK SPACE

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HINT, HINT

Read the problem carefully. Break the problem into steps.

WORK SPACE

6. Part A

Josh can sew 3 shirts from a piece of 18-meter fabric. How many complete shirts can he sew from 53 meters of fabric?

Write your answer in the box.

8 shirts

Part B

Josh wants to sew a jacket from the leftover fabric. Each jacket needs 3 meters of fabric. Does Josh have enough fabric to sew the jacket? Explain how you got your answer.

Sample answer: Yes. Josh has enough fabric to sew the jacket because 53 ÷ 6 = 8 R5. He is left with 5 meters of fabric. He only needs 3 meters to sew the jacket.

7. A swim club is organizing groups for summer swim classes. Each group can have up to 4 people. 135 boys, 168 girls, and 16 adults have enrolled for the classes. How many groups does the swim club have to make to get everyone in a class? Will every group have the same number of students? Explain how you got your answer.

Sample answer: I added the number of people who enrolled. 135 + 168 + 16 = 319. I divided to get the number of groups. 319 ÷ 4 = 79 R3. The swim club can make 80 groups: 79 groups of 4 students each, and one group of 3 students.

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EXIT TICKET

4.OA.3

Now that you have mastered solving multi-step word problems, let's solve the problem in the Real-World Connection.

Melissa went to meet her aunt. She spent $9 on snacks for the trip and $11 on her lunch. Then she bought a scarf for her aunt for $15. Melissa's aunt gave Melissa $20 for her birthday. Melissa had $45 when she left home. How much money did she have when she returned home from her aunt's house?

When Melissa got home, she had $30.

Figure out how much Melissa spent on the way to her aunt's house.

$9 + $11 + $15

Subtract the amount she spent from the amount she had when she left.

$45 − ($9 + $11 + $15)

Add the amount of money that her aunt gave her.

$45 − ($9 + $11 + $15) + $20

Use *A* to represent the total amount of money Melissa had when she got home.

$A = \$45 - (\$9 + \$11 + \$15) + \$20$

Solve the equation.

$A = \$45 - (\$9 + \$11 + \$15) + \$20$

$A = \$45 - \$35 + \$20$

$A = \$10 + \$20$

$A = \$30$

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PRACTICE TEST

CHAPTER 2

Answer the questions.

1. Find the sum of 11,285 and 25,389.

   Write your answer in the box.

   36,674

2. What is the difference of 3,482 − 974?

   Write your answer in the box.

   2,508

3. Write the numbers in each box to complete the addition problem.

$$\begin{array}{r} {\scriptstyle 1\ \ 1\ \ \ } \\ 8\ 3\ 4 \\ +\ 2\ 9\ 6 \\ \hline 1\ 1\ 3\ 0 \end{array}$$

4. Part A

   649 × 9 = ?

   Ⓐ 8514

   Ⓑ 5841

   Ⓒ 5461

   Ⓓ 1710

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Part B

Explain how you found the answer to Part A.

Sample answer: I used the Distributive Property:

649 × 9 = (600 + 40 + 9) × 9

= 600 × 9 + 40 × 9 + 9 × 9

= 5400 + 360 + 81

= 5841

5. Tom says that he can find 12 × 18 mentally using two partial products, 10 × 18 and 2 × 18. Is Tom correct? Explain your answer.

Sample answer: Yes, Tom is correct. The first step of the Distributive Property is to break apart one number. 12 = 10 + 2, so 10 × 18 + 2 × 18 is the same as (10 + 2) × 18.

Tom can mentally find 10 × 18 = 180 and 2 × 18 = 36, and add the products to get 216.

6. Find the product for each multiplication problem.

55 × 12 =	660
415 × 8 =	3,320
42 × 66 =	2,772
3,255 × 3 =	9,765
248 × 5 =	1,240

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7. Alexis has 145 stickers. She wants to divide the stickers evenly among 5 of her friends. How many stickers will each friend get?

Write your answer in the box.

29 stickers

8. Part A

There are 2,472 seats in the school auditorium. The seats are divided into 6 equal sections. How many seats are in each section? Write your answer in the box.

412 seats

Part B

Explain how you found your answer. Show your work.

Sample answer:

$412 = 400 + 10 + 2$

$6\overline{)2,472 = 2,400 + 60 + 12}$

$-\ 2,400 = 6 \times 400$

72

$-\ 60 = 6 \times 10$

12

$-\ 12 = 6 \times 2$

0

To divide 2,472 by 6, I thought of a multiple of 6 that is close to the dividend, 2,472. 6×400 is 2,400. I subtracted that from 2,472. The difference was 72. I thought of a multiple of 6 that is close to 72. 6×10 is 60. I subtracted 60 from 72 = 12. $6 \times 2 = 12$. I subtracted to get 0. Then I added the factors to find the quotient. $400 + 10 + 2 = 412$. There are 412 seats in each section.

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9. What is 534 ÷ 7?

Write your answer in the book.

76 R2

10. There are 15 tables at a restaurant. There are 4 times as many chairs as there are tables. How many chairs are there?

Write your answer in the box.

60 chairs

11. Which statement is true?

(A) 86 butterflies is 3 times as many butterflies as 43 butterflies.

(B) 14 mystery books is 7 times more books than 28 history books.

(C) 45 blue cars is 5 times more cars than 225 red cars.

(D) Erin walked 60 miles. Frank walked 20 miles. Erin walked 3 times more miles than Frank.

12. A factory makes 196 wooden baskets. Each basket has 2 wooden handles. One-twelfth of the handles were broken.

Which number correctly completes the statement?

About _____ of the handles were broken and could not be used.

(A) 30

(B) 300

(C) 3,000

(D) 30,000

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13. In a football game, the Tigers scored 9 touchdowns and the Leopards scored 5 touchdowns. Each touchdown is worth 6 points. What equation can be used to find how many more points the Tigers scored than the Leopards? Use p to represent the number of points.

Write your equation and answer to the problem in the box.

$p = (9 \times 6) - (5 \times 6)$ or $p = (9 - 5) \times 6$ and $p =$ 24

14. Last month, Mr. Foreman spent $105 on landscaping, $448 on utility bills, $115 on his cell-phone bill, and $143 on his cable-Internet bill. He received a credit of $21 on his cell-phone bill. He estimated his total expenses for these bills for last month to be about $780. Use estimation strategies to see if Mr. Foreman's estimate is correct.

Sample answer: Mr. Foreman's estimate is correct. I rounded 105 to 100, 448 to 450, 115 to 100, and 143 to 150. I added all of the estimated bills: 100 + 450 + 100 + 150 = 200 + 450 + 150 = 200 + 600 = $800. Also, I rounded the credit of $21 to $20. Mr. Foreman's total expense on bills was $800 − $20 = $780.

15. Solve each problem. Find each quotient and write it in the appropriate box.

716 ÷ 4 = 179 8,135 ÷ 5 = 1,627 428 ÷ 2 = 214

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Equivalent fractions are different fractions that describe the same amount.

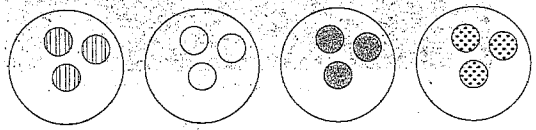
- Two parts out of four is the same amount as one part out of two, so $\frac{2}{4}$ and $\frac{1}{2}$ are equivalent fractions.
- You can use multiplication to find equivalent fractions.

SKETCH IT

Reread the problem from the beginning of the lesson. Identify the fractions. Draw a model to represent the pizza.

EXAMPLE

The picture shows Joni's 12 marbles divided into 4 equal groups.



Three of the 12 marbles are striped. So, $\frac{3}{12}$ of Joni's marbles are striped.

One of the 4 equal groups contains striped marbles. So, $\frac{1}{4}$ of Joni's marbles are striped.

$\frac{3}{12}$ and $\frac{1}{4}$ are different ways to describe the same amount.

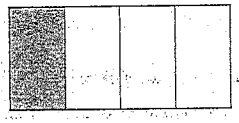
$\frac{3}{12}$ and $\frac{1}{4}$ are equivalent fractions.

TURN AND TALK

Discuss how to find other fractions equivalent to $\frac{1}{4}$. By what other numbers could you multiply?

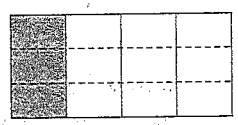
EXAMPLE

You can multiply the numerator and denominator of a fraction by the same whole number to generate an equivalent fraction.



This rectangle has 4 parts and 1 part is shaded blue.

This model shows the fraction $\frac{1}{4}$.



This rectangle has 12 parts and 3 parts are shaded blue.

This model shows the fraction $\frac{3}{12}$.

You can multiply the model on the left by $\frac{3}{3}$ to show the model on the right.

$\frac{1}{4} = \frac{1 \times 3}{4 \times 3} = \frac{3}{12}$

$\frac{1}{4}$ and $\frac{3}{12}$ are equivalent fractions.

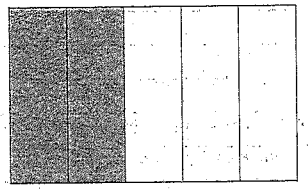
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GUIDED INSTRUCTION

1. Show that $\frac{2}{5}$ and $\frac{4}{10}$ are equivalent fractions.

Method One Use a model.

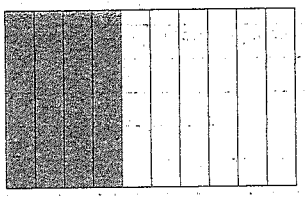
Step One Model the first fraction. Draw a figure divided into 5 equal parts. Shade 2 of the parts.



This model shows the fraction $\frac{2}{5}$

Step Two Model the second fraction.

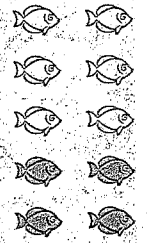
Draw the same figure but divide it into 10 equal parts. Shade 4 of the parts.



This model shows the fraction $\frac{4}{10}$

SKETCH IT

You can show equivalent fractions with sets of objects:



4 of the 10 fish are blue.

2 of the 5 rows are blue fish.

$\frac{4}{10} = \frac{2}{5}$

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Step Three Compare.

Because equal parts are shaded in the two models, these models show equivalent fractions.

Method Two Use Multiplication.

Multiply the numerator and the denominator by the same number.

$\frac{2}{5} = \frac{2 \times 2}{5 \times 2} = \frac{4}{10}$

Since you can multiply the numerator and denominator by 2 to go from $\frac{2}{5}$ to $\frac{4}{10}$, the fractions are equivalent.

TIPS AND TRICKS

Use multiplication facts or pictures to help you think about each fraction and determine if it is equivalent.

2. Select THREE fractions that are equivalent to $\frac{1}{4}$.

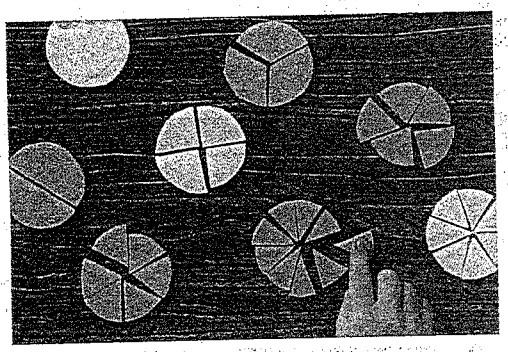
Ⓐ $\frac{3}{12}$

Ⓑ $\frac{3}{10}$

Ⓒ $\frac{2}{8}$

Ⓓ $\frac{1}{3}$

Ⓔ $\frac{25}{100}$



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How Am I Doing?

What questions do you have?

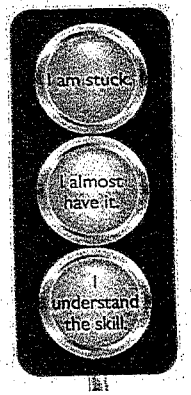
Describe a real-life situation in which you need to determine whether two fractions are equivalent.

Find a set of objects in the classroom. Separate them into equal groups. How can you use equivalent fractions to describe one of the groups?

TURN AND TALK

Cameron made 12 cupcakes. She frosted 3 of the 12 cupcakes with chocolate frosting. Work with a partner to write two fractions for the number of cupcakes that had chocolate frosting. Explain your answer.

Color in the traffic signal that shows how you are doing with the skill.



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INDEPENDENT PRACTICE

Answer the questions.

1. Complete the number sentence to show that the fractions are equivalent.

   Write your answer in the box.

   $\frac{3}{5} = \frac{\boxed{6}}{10}$

2. Select THREE fractions that are equivalent to $\frac{3}{6}$.

   Ⓐ $\frac{8}{12}$

   Ⓑ $\frac{4}{8}$

   Ⓒ $\frac{3}{4}$

   Ⓓ $\frac{6}{12}$

   Ⓔ $\frac{2}{4}$

   Ⓕ $\frac{1}{3}$

3. Which fraction is equivalent to $\frac{2}{10}$?

   Ⓐ $\frac{2}{5}$

   Ⓑ $\frac{4}{5}$

   Ⓒ $\frac{15}{100}$

   Ⓓ $\frac{20}{100}$

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4. Which fraction is equivalent to $\frac{1}{2}$?

   Ⓐ $\frac{2}{8}$

   Ⓑ $\frac{4}{12}$

   Ⓒ $\frac{3}{6}$

   Ⓓ $\frac{25}{100}$

5. Select THREE fractions that are equivalent to $\frac{3}{12}$.

   Ⓐ $\frac{25}{100}$

   Ⓑ $\frac{9}{10}$

   Ⓒ $\frac{2}{8}$

   Ⓓ $\frac{1}{4}$

   Ⓔ $\frac{2}{3}$

   Ⓕ $\frac{20}{100}$

6. Which number correctly completes the statement?

   2 out of 3 equal pieces is the same as ___ out of 12 equal pieces.

   Ⓐ 4

   Ⓑ 6

   Ⓒ 7

   Ⓓ 8

WORK SPACE

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WORK SPACE

7. Part A

Which fraction is equivalent to $\frac{2}{8}$?

Ⓐ $\frac{5}{12}$

Ⓑ $\frac{5}{10}$

Ⓒ $\frac{1}{4}$

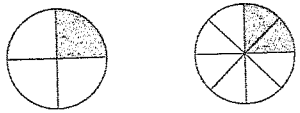
Ⓓ $\frac{1}{3}$

Part B

Draw a picture to show your reasoning in Part A.

Explain your answer.

Sample answer:



I drew a circle. I divided it into four equal parts and shaded one piece. I drew the same size figure. I divided it into eight equal parts and shaded two pieces. I shaded the same area of each figure. $\frac{1}{4} = \frac{2}{8}$.

8. Complete the number sentences so that the fractions are equivalent.

Write your answers in the boxes.

$\frac{3}{5} = \frac{12}{20} = \frac{\boxed{21}}{35}$

$\frac{1}{4} = \frac{3}{12} = \frac{\boxed{25}}{100}$

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EXIT TICKET

4.NF.1

Now that you have mastered equivalent fractions, let's solve the problem in the Real-World Connection.

Tim and his family are eating a whole-wheat pizza. Tim ate $\frac{1}{3}$ of the pizza, Jake ate $\frac{1}{6}$, and their dad ate $\frac{1}{4}$. If the pizza was cut into 12 slices, how many slices are left for their mom?

Use equivalent fractions to find how many slices each person ate and how many were left for their mom.

Tim: [4] slices Jake: [2] slices Dad: [3] slices

Slices left for mom: [3] slices

$3 \times 4 = 12$, so $\frac{1}{3} = \frac{1 \times 4}{3 \times 4} = \frac{4}{12}$ Tim ate $\frac{1}{3}$ of the pizza. That is the same as eating 4 slices out of 12.

$6 \times 2 = 12$, so $\frac{1}{6} = \frac{1 \times 2}{6 \times 2} = \frac{2}{12}$ Jake ate $\frac{1}{6}$ of the pizza. That is the same as eating 2 slices out of 12.

$4 \times 3 = 12$, so $\frac{1}{4} = \frac{1 \times 3}{4 \times 3} = \frac{3}{12}$ Dad ate $\frac{1}{4}$ of the pizza. That is the same as eating 3 slices out of 12.

The pizza was cut into 12 slices, and 9 slices were eaten. $12 - 9 = 3$ slices left.

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SKETCH IT

Draw a picture to compare the fractions. Remember to use the same-size whole for each fraction.

EXAMPLE

You can use benchmark fractions to compare $\frac{3}{8}$ and $\frac{5}{6}$.

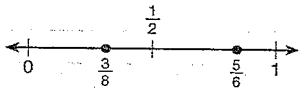
Think about the fraction $\frac{1}{2}$. Compare each fraction to $\frac{1}{2}$.

A fraction is equivalent to $\frac{1}{2}$ if the numerator is half of the denominator.

$\frac{1}{2} = \frac{4}{8}$	$\frac{1}{2} = \frac{3}{6}$
$\frac{3}{8} < \frac{4}{8}$	$\frac{5}{6} > \frac{3}{6}$
$\frac{3}{8}$ is less than $\frac{1}{2}$.	$\frac{5}{6}$ is greater than $\frac{1}{2}$.

Since $\frac{3}{8}$ is less than $\frac{1}{2}$ and $\frac{5}{6}$ is greater than $\frac{1}{2}$, you know that $\frac{3}{8}$ is less than $\frac{5}{6}$.

A number line can show how each fraction compares to the benchmark.



GUIDED INSTRUCTION

HINT, HINT

When the numerators are the same, the fraction with the greater denominator will be the lesser fraction.

1. Compare and order the following fractions from least to greatest.

$\frac{2}{5}$ $\frac{3}{12}$ $\frac{3}{5}$ $\frac{2}{6}$

Step One Compare fractions with the same denominator.

Look at the numerators.

$\frac{2}{5} < \frac{3}{5}$

Step Two Compare fractions with the same numerators.

Look at the denominators. Sixths are smaller pieces than fifths.

$\frac{2}{6} < \frac{2}{5}$

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Step Three When the numerator and denominator are different, use multiplication to make equivalent fractions with a common denominator. Then compare numerators.

$\frac{3}{12}$ and $\frac{2}{6}$

$\frac{2}{6} = \frac{2 \times 2}{2 \times 6} = \frac{4}{12}$

$\frac{3}{12}$ [<] $\frac{4}{12}$

So, $\frac{3}{12}$ [<] $\frac{2}{6}$.

Step Four Order the fractions from least to greatest.

$\frac{3}{12}$ [<] $\frac{2}{6}$ [<] $\frac{2}{5}$ [<] $\frac{3}{5}$

2. Select THREE fractions that are less than $\frac{1}{2}$.

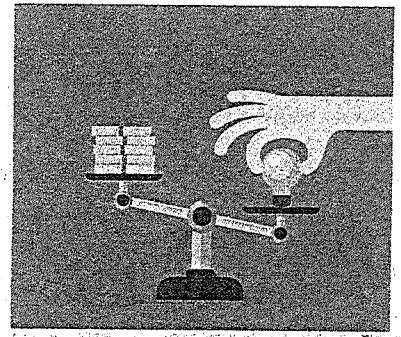
Ⓐ $\frac{4}{5}$

Ⓑ $\frac{3}{8}$

Ⓒ $\frac{3}{10}$

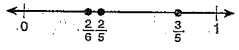
Ⓓ $\frac{8}{12}$

Ⓔ $\frac{1}{3}$



SKETCH IT

You can draw and use a number line to organize your work.



TIPS AND TRICKS

You can use shaded models, number lines, or equivalent values to compare fractions.

SKETCH IT

Draw a fraction model with the correct number of parts shaded. Are the parts more than half?

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SKETCH IT

Carly and Will have the same size individual pies. Carly eats $\frac{2}{3}$ of her pie. Will eats $\frac{4}{5}$ of his pie. Who eats more? In the margin below or on a separate piece of paper, draw a number line or model to support your answer.

Color in the traffic signal that shows how you are doing with the skill.



How Am I Doing?

What questions do you have?

Describe a real-life situation in which you need to compare two fractions.

Think about the fraction $\frac{5}{11}$. How can you quickly tell if it is more or less than $\frac{1}{2}$?

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INDEPENDENT PRACTICE

Answer the questions.

1. Which comparison is not true?

   Ⓐ $\frac{5}{10} < \frac{9}{10}$
   Ⓑ $\frac{3}{5} > \frac{3}{4}$
   Ⓒ $\frac{8}{12} > \frac{4}{12}$
   Ⓓ $\frac{4}{8} < \frac{4}{6}$

2. Compare the fractions using <, >, or =. Write your answer in the box.

   $\frac{4}{5}$ [<] $\frac{9}{10}$

3. Which fraction is greater than to $\frac{1}{2}$?

   Ⓐ $\frac{5}{6}$
   Ⓑ $\frac{3}{8}$
   Ⓒ $\frac{4}{12}$
   Ⓓ $\frac{4}{8}$

HINT, HINT

Cutting a pie into more pieces means that each piece will be smaller.

WORK SPACE

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4 Write the order of each fraction from least (1) to greatest (5).

Order	Fraction
3	$\frac{1}{2}$
5	$\frac{7}{8}$
1	$\frac{1}{5}$
4	$\frac{3}{4}$
2	$\frac{2}{5}$

TIPS AND TRICKS

The fractions $\frac{1}{4}$, $\frac{1}{2}$, and $\frac{3}{4}$ make great benchmarks because they are easy to recognize in fraction models.

5. Part A

Compare the fractions using <, >, or =.

Write your answer in the box.

$\frac{11}{12}$ [>] $\frac{2}{5}$

Part B

Explain how you could use a benchmark fraction to answer the question in Part A.

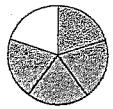
Sample answer: $\frac{1}{2}$ is equivalent to $\frac{6}{12}$ and $\frac{6}{12} < \frac{11}{12}$. $\frac{2}{5}$ is equivalent to $\frac{4}{10}$ and $\frac{4}{10} < \frac{5}{10} = \frac{1}{2}$. Because $\frac{2}{5}$ is less than $\frac{1}{2}$ and $\frac{11}{12}$ is greater than $\frac{1}{2}$, you know $\frac{2}{5} < \frac{11}{12}$.



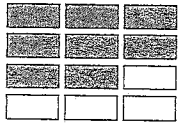
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6 Select THREE pictures that show fractions less than $\frac{3}{4}$.

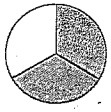
A



B



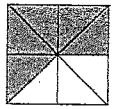
C



D



E



7. Part A

Compare the fractions using <, >, or =. Write your answer in the box.

$\frac{7}{12}$ [<] $\frac{2}{3}$

SKETCH IT

Use a model to compare fractions. The greater fraction has the greater shaded area.

Part B

Describe a real-world situation in which the inequality in Part A is not true.

Sample answer: To compare fractions, they must have the same-size whole. If I think of $\frac{7}{12}$ of a large item, like a poster board, it will be greater than $\frac{2}{3}$ of a smaller item, like a sheet of paper.

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EXIT TICKET

4.NF.2

Now that you have mastered comparing fractions, let's solve the problem in the Real-World Connection.

Alex and Rohan are comparing car collections. They each have the same number of cars. $\frac{3}{4}$ of Alex's collection and $\frac{2}{3}$ of Rohan's collection are antique cars. Alex claims to have more antique cars, but Rohan disagrees. Which friend is correct?

Alex is correct.

Compare $\frac{3}{4}$ and $\frac{2}{3}$. First, rewrite the fractions so that they have the same denominator.

$\frac{3}{4} = \frac{3 \times 3}{4 \times 3} = \frac{9}{12}$ and $\frac{2}{3} = \frac{2 \times 4}{3 \times 4} = \frac{8}{12}$

Then look at the numerators to compare: $\frac{9}{12} > \frac{8}{12}$. Since $\frac{3}{4}$ is greater than $\frac{2}{3}$ and Alex and Rohan have the same number of cars, Alex has more antique cars.

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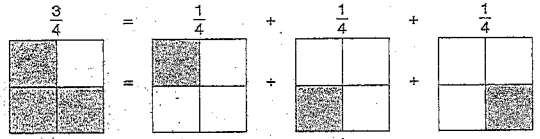
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- A fraction with a numerator of 1 and any denominator is called a unit fraction.
  - $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{5}$ are all unit fractions because they each have a numerator of 1.
- You can add or subtract fractions by combining or joining parts.
  - When the denominators are the same, add or subtract the numerators.
  - The denominator stays the same.
  - You can think of any fraction as the sum of unit fractions with the same denominator. For example, $\frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{3}{4}$.

EXAMPLE

Write the fraction $\frac{3}{4}$ as the sum of unit fractions.

$\frac{3}{4} = \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$

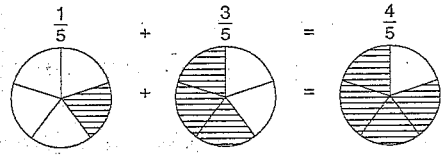




EXAMPLE

Add fractions when the denominators are the same.

$\frac{1}{5} + \frac{3}{5} = \frac{4}{5}$



Add the numerators ($1 + 3 = 4$), and the denominator (5) stays the same.

TURN AND TALK

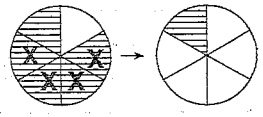
Do all three circles shown have to be the same size?

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EXAMPLE

Subtract fractions when the denominators are the same.

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



Subtract the numerators ($5 - 4 = 1$), and the denominator (6) stays the same.

GUIDED INSTRUCTION

1. Write $\frac{2}{3}$ as the sum of unit fractions.

   Step One A unit fraction has a numerator of 1. Think of the number of ones that make up the number in the numerator.

   $2 = 1 + 1$

   Step Two Break the fraction down into unit fractions with the same denominator.

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

   Step Three Write the equation.

   $\frac{2}{3} = \frac{1}{3} + \frac{1}{3}$

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

   Step One Write the expression for the sum of the two fractions.

   $\frac{3}{6} + \frac{1}{6}$

   Step Two Add the numerators. The denominators stay the same.

   $3 + \boxed{1} = \boxed{4}$

THINK ABOUT IT

Think of $\frac{2}{3}$ as two pieces that are each a third of the whole.

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Step Three Write the equation.

$\frac{3}{6} + \frac{1}{6} = \frac{4}{6}$

3. Subtract $\frac{6}{8} - \frac{2}{8}$.

Step One Write the expression for the difference of the two fractions.

$\frac{6}{8} - \frac{2}{8}$

Step Two Subtract the numerators. The denominators stay the same.

$6 - 2 = 4$

Step Three Write the equation.

$\frac{6}{8} - \frac{2}{8} = \frac{4}{8}$

TIPS AND TRICKS

When writing a fraction as the sum of unit fractions, check your work by counting the number of unit fractions to see if they equal the numerator in the original fraction.

4. Dario and Terry ordered the same sandwich. Dario ate $\frac{2}{6}$ of his sandwich. Terry ate $\frac{3}{6}$ of his sandwich. Select THREE statements that are true.

(A) Dario ate $\frac{1}{6} + \frac{1}{6}$ of a sandwich.

(B) Terry ate $\frac{1}{6} + \frac{1}{6}$ of a sandwich.

(C) Together, Dario and Terry ate $\frac{5}{12}$ of a sandwich.

(D) Together, Dario and Terry ate $\frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6}$ of a sandwich.

(E) Together, Dario and Terry ate $\frac{5}{6}$ of a sandwich.

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How Am I Doing?

What questions do you have?

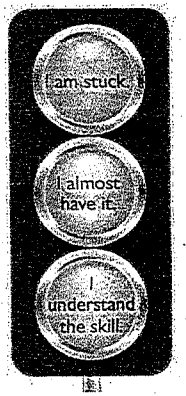
How can you write a fraction as the sum of unit fractions?

Explain in your own words how to add or subtract fractions with the same denominator.

TURN AND TALK

Natalie divided a pie into 10 pieces. She put 7 of the pieces on plates. What fraction of the pie is still in the pie dish? Work with a partner. Explain how you found your answer.

Color in the traffic signal that shows how you are doing with the skill.



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INDEPENDENT PRACTICE

Answer the questions.

HINT, HINT

Remember, a unit fraction is a fraction with a numerator of 1.

1. Write $\frac{3}{5}$ as the sum of unit fractions.

$\frac{3}{5} = \frac{1}{5} + \frac{1}{5} + \frac{1}{5}$

2. Which number correctly completes the statement?

The fraction $\frac{4}{5}$ can be written as the sum of _____ unit fractions with a denominator of 5.

Ⓐ 5
Ⓑ 4
Ⓒ 3
Ⓓ 2

THINK ABOUT IT

What makes each of the other three answers incorrect?

3. Melissa mowed $\frac{1}{4}$ of the yard. Harry mowed $\frac{2}{4}$ of the yard. Select THREE statements that are true.

Ⓐ Melissa mowed $\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$ of the yard.
Ⓑ Harry mowed $\frac{1}{4} + \frac{1}{4}$ of the yard.
Ⓒ Melissa and Harry each mowed $\frac{1}{4}$ of the yard.
Ⓓ Together, Melissa and Harry mowed $\frac{1}{4}$ of the yard.
Ⓔ Together, Melissa and Harry mowed $\frac{1}{4} + \frac{1}{4} + \frac{1}{4}$ of the yard.
Ⓕ Together, Melissa and Harry mowed $\frac{3}{4}$ of the yard.

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4. Find $\frac{5}{5} - \frac{3}{5}$.

Write your answer in the box.

$\frac{2}{5}$

5. Find $\frac{4}{4} + \frac{1}{4}$.

Write your answer in the box.

$\frac{5}{4}$ or $1\frac{1}{4}$

6. What is $\frac{5}{6} - \frac{2}{6}$?

Write your answer in the box.

$\frac{3}{6}$

7. **Part A**

Warren ate $\frac{1}{8}$ of a pie. Jacob ate $\frac{3}{8}$ of the pie. Mariah ate $\frac{2}{8}$ of the pie. How much of the pie did they eat in all? Write your answer in the box.

$\frac{6}{8}$

SKETCH IT

Draw a fraction model to help you solve word problems that involve adding or subtracting fractions.

Part B

Explain how you found your answer.

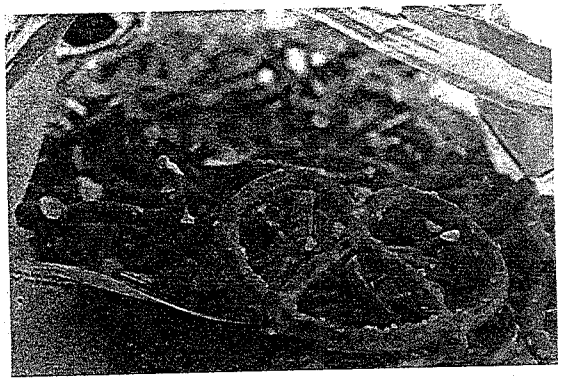
Sample answer: I added the numerators 1 + 3 + 2 = 6. The denominator stays the same. $\frac{1}{8} + \frac{3}{8} + \frac{2}{8} = \frac{6}{8}$.

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WORK SPACE

8. Three friends shared two bags of pretzels. Greg ate $\frac{1}{4}$ of a bag of pretzels. Kelly ate $\frac{2}{4}$ of a bag of pretzels. Sally ate $\frac{3}{4}$ of a bag of pretzels. How much of a bag of pretzels is left? Explain.

Sample answer: $\frac{2}{4}$ of a bag is left. Two bags of pretzels have $\frac{4}{4} + \frac{4}{4}$, or $\frac{8}{4}$ of pretzels. The friends ate $\frac{1}{4} + \frac{2}{4} + \frac{3}{4} = \frac{6}{4}$ pretzels. $\frac{8}{4} - \frac{6}{4} = \frac{2}{4}$.



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EXIT TICKET

4.NF3, 4.NF3a

Now that you have mastered the adding and subtracting fractions, let's solve the problem in the Real-World Connection.

Fiona and Sam shared a pie. Fiona ate $\frac{3}{6}$ of the pie, and Sam ate $\frac{2}{6}$ of the pie.

How much of the pie did they eat in all?

Add fractions to find out how much of the pie Fiona and Sam ate.

Fiona and Sam ate $\frac{5}{6}$ of the pie.

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

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HINT, HINT

When decomposing fractions, check your work by making sure the numerators in the decomposed fractions add up to the numerator in the original fraction.

TURN AND TALK

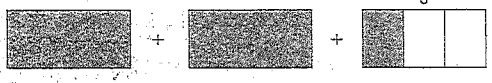
Can you think of any other ways to model $2\frac{1}{3}$?

EXAMPLE

The equations and fraction models show two different ways to decompose the mixed number $2\frac{1}{3}$. The top equation and model show the mixed number. The bottom equation and model show the equivalent improper fraction, $\frac{7}{3}$.

This equation and model show the mixed number decomposed into two wholes and a fraction.

$2\frac{1}{3} = 1 + 1 + \frac{1}{3}$



This equation and model show the mixed number decomposed into unit fractions. It shows that $2\frac{1}{3} = \frac{7}{3}$.

$2\frac{1}{3} = \frac{7}{3} = \frac{3}{3} + \frac{3}{3} + \frac{1}{3}$



GUIDED INSTRUCTION

1. Decompose $\frac{3}{6}$ in two different ways using equations and fraction models.

Method One You can decompose $\frac{3}{6}$ by breaking it into three unit fractions.



$\frac{3}{6} = \frac{1}{6} + \frac{1}{6} + \frac{1}{6}$

Method Two You can also decompose $\frac{3}{6}$ by breaking it into fractions with numerators that total 3.



$\frac{3}{6} = \frac{1}{6} + \frac{2}{6}$

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2. Decompose $1\frac{1}{4}$ in two different ways using equations and fraction models.

Method One You can decompose $1\frac{1}{4}$ by breaking it into 1 whole and $\frac{1}{4}$.

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



Method Two You can also decompose $1\frac{1}{4}$ by breaking it into $\frac{4}{4}$ and $\frac{1}{4}$.

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





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SKETCH IT

Draw fraction models to represent four ways that $\frac{5}{3}$ can be decomposed.

3. Decompose $\frac{5}{3}$ in four different ways using equations.

Method One You can decompose $\frac{5}{3}$ by breaking it into unit fractions.

$$\frac{5}{3} = \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3}$$

Method Two You can also decompose $\frac{5}{3}$ by breaking it into 1 whole and $\frac{2}{3}$.

$$\frac{5}{3} = 1 + \frac{2}{3}$$

Method Three You can also decompose $\frac{5}{3}$ by breaking it into fractions with a denominator of 3 and numerators that total 5.

$$\frac{5}{3} = \frac{4}{3} + \frac{1}{3}$$

Method Four There is another way to decompose $\frac{5}{3}$ by breaking it into fractions with a denominator of 3 and numerators that total 5.

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

HINT, HINT

Count unit fractions carefully. Make sure that the sum of the numerators equals the numerator in the fraction that you are decomposing.

4. Which equations represent ways to correctly decompose $\frac{7}{8}$? Select THREE answers.

Ⓐ $\frac{7}{8} = \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$

Ⓑ $\frac{7}{8} = \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$

Ⓒ $\frac{7}{8} = \frac{4}{8} + \frac{3}{8}$

Ⓓ $\frac{7}{8} = 7 + 8$

Ⓔ $\frac{7}{8} = \frac{5}{8} + \frac{2}{8}$

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How Am I Doing?

What questions do you have?

How can you decompose a fraction as the sum of unit fractions?

Which method do you prefer in decomposing fractions: fraction models or equations? Why?

TURN AND TALK

Work with a partner to solve this: Sawyer needs $\frac{3}{8}$ cup of berries for a recipe. He only has a $\frac{1}{8}$ cup measuring cup. Write $\frac{3}{8}$ as a sum of fractions to show how many times he would add $\frac{1}{8}$ cup of berries to get the correct amount of berries.

Color in the traffic signal that shows how you are doing with the skill.



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INDEPENDENT PRACTICE

Answer the questions.

1. One way to decompose $\frac{5}{12}$ is $\frac{1}{12} + \frac{1}{12} + \frac{1}{12} + \frac{1}{12} + \frac{1}{12}$. What is another way?

   Write your answer in the box.

   $\frac{5}{12} = \frac{3}{12} +$ [$\frac{2}{12}$]

HINT, HINT

Any whole number can be expressed as a fraction where the numerator and denominator are the same.

2. Which equation shows a way to decompose $2\frac{5}{8}$?

   (A) $2\frac{5}{8} = 1 + 2 + \frac{5}{8}$

   (B) $2\frac{5}{8} = \frac{5}{8} + \frac{5}{8} + \frac{5}{8}$

   (C) $2\frac{5}{8} = 2 + 2 + \frac{5}{8}$

   (D) $2\frac{5}{8} = \frac{8}{8} + \frac{8}{8} + \frac{5}{8}$

3. Which equations represent ways to correctly decompose $\frac{6}{10}$? Select THREE answers.

   (A) $\frac{6}{10} = \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10}$

   (B) $\frac{6}{10} = \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10}$

   (C) $\frac{6}{10} = \frac{2}{10} + \frac{2}{10} + \frac{2}{10}$

   (D) $\frac{6}{10} = \frac{2}{10} + \frac{2}{10} + \frac{1}{10} + \frac{1}{10}$

   (E) $\frac{6}{10} = \frac{2}{10} + \frac{3}{10} + \frac{3}{10}$

   (F) $\frac{6}{10} = \frac{5}{10} + \frac{2}{10}$

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4. Write the fractions in the boxes to make each equation true.

   $\frac{6}{5} = \frac{1}{5} +$ [$\frac{5}{5}$]

   $\frac{6}{5} = \frac{4}{5} +$ [$\frac{2}{5}$]

   $\frac{6}{5} = \frac{3}{5} +$ [$\frac{3}{5}$]

5. Which equation shows a way to decompose $\frac{3}{6}$?

   (A) $\frac{3}{6} = \frac{1}{6} + \frac{1}{6} + \frac{1}{6}$

   (B) $\frac{3}{6} = \frac{5}{6} + \frac{1}{6}$

   (C) $\frac{3}{6} = \frac{4}{6} + \frac{3}{6}$

   (D) $\frac{3}{6} = \frac{1}{6} + \frac{4}{6}$

6. Part A

   Yvonne and Jamal are sharing $\frac{7}{4}$ loaves of bread. Write two equations showing different ways they can share the bread.

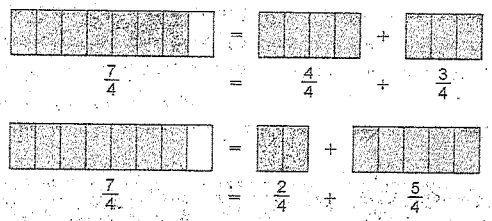
   Write your answer in the box.

   Sample answer: $\frac{7}{4} = \frac{4}{4} + \frac{3}{4}$ or $\frac{7}{4} = \frac{2}{4} + \frac{5}{4}$

Part B

Justify your answer using fraction models.

Sample answer:



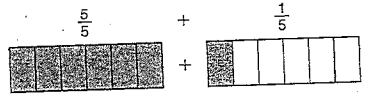
WORK SPACE

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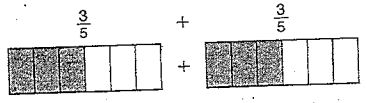
WORK SPACE

Alicia decomposed the fraction $\frac{6}{5}$ using these equations and fraction models. Is Alicia correct? If not, show the correct equations or models.

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

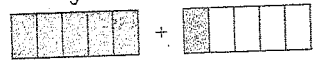


$\frac{6}{5} = \frac{3}{5} + \frac{3}{5}$

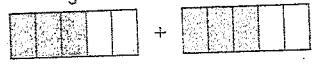


Sample answer: Alicia's equations are correct, but her models are incorrect. Her models show the fractions as sixths. They should be shown as fifths.

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



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



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EXIT TICKET

4.NF.3, 4.NF.3b

Now that you have mastered decomposing fractions, let's solve the problem in the Real-World Connection.

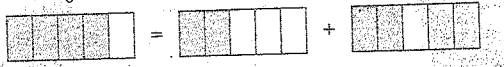
Quinn and Tyson are sharing $\frac{4}{5}$ of a block of cheese. What are two different fraction amounts that can be used to show how they could share the block of cheese?

Decompose the fraction in two different ways.

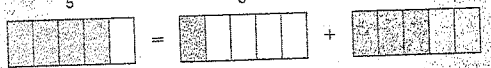
One way: Sample answer: $\frac{2}{5} + \frac{2}{5} = \frac{4}{5}$

Another way: Sample answer: $\frac{1}{5} + \frac{3}{5} = \frac{4}{5}$

$\frac{4}{5} = \frac{2}{5} + \frac{2}{5}$



$\frac{4}{5} = \frac{1}{5} + \frac{3}{5}$



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2. Find the sum: $1\frac{4}{5} + 7\frac{2}{5}$

Step One Add the fraction parts of the mixed numbers.

$\frac{4}{5} + \frac{2}{5} = \frac{6}{5}$

Step Two Rename the sum of the fraction parts as a mixed number.

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

Step Three Add the whole-number parts of the mixed numbers.

$1 + 7 = 8$

Step Four Rename the sum as a mixed number with a fractional part less than 1.

$8 + 1 + \frac{1}{5} = 9\frac{1}{5}$

So, $1\frac{4}{5} + 7\frac{2}{5} = 9\frac{1}{5}$

HINT, HINT

Remember, you can check your answer using addition.

3. Select THREE of the following that are equivalent to $2\frac{1}{8} - 1\frac{3}{8}$.

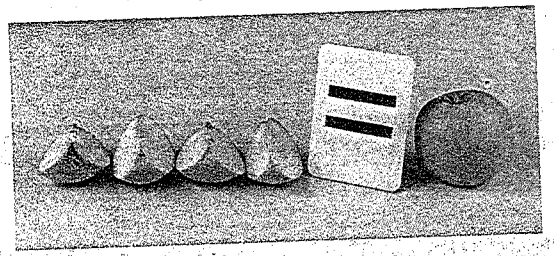
Ⓐ $\frac{16}{8} - \frac{4}{8}$

Ⓑ $1\frac{9}{8} - 1\frac{3}{8}$

Ⓒ $\frac{17}{8} - \frac{11}{8}$

Ⓓ $\frac{6}{8}$

Ⓔ $1\frac{4}{8}$



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How Am I Doing?

What questions do you have?

When must you regroup to subtract mixed numbers?

What is an example of a mixed number you have seen in everyday life, perhaps something that was measured?

TURN AND TALK

How could you use the relationship between addition and subtraction to subtract $5\frac{7}{8}$ from $6\frac{1}{8}$? With a partner, explain and solve the problem.

Color in the traffic signal that shows how you are doing with the skill.



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WORK SPACE

INDEPENDENT PRACTICE

Answer the questions.

1. Which subtraction expression is equivalent to $7\frac{1}{4} - 2\frac{3}{4}$?

   (A) $\frac{29}{4} - \frac{11}{4}$

   (B) $6\frac{5}{4} - 3\frac{3}{4}$

   (C) $\frac{28}{4} - \frac{8}{4}$

   (D) $5\frac{10}{4} - 1\frac{7}{4}$

2. Last month, Juan read for $10\frac{1}{3}$ hours. This month, he read for $20\frac{2}{3}$ hours. In the two months, how many hours did Juan read in all?

   (A) 31 hours

   (B) $30\frac{1}{3}$ hours

   (C) 30 hours

   (D) $10\frac{1}{3}$ hours

3. What is $1\frac{3}{8} + 2\frac{7}{8}$?

   Write your answer in the box.

   $4\frac{2}{8}$ or $4\frac{1}{4}$

HINT, HINT

Find key words to help you solve word problems. In this problem, the phrase "how many more" means that you need to subtract.

4. Mary biked $2\frac{2}{5}$ miles on Saturday and $1\frac{3}{5}$ miles on Sunday. How many more miles did Mary bike on Saturday than Sunday?

   (A) 5 miles

   (B) $1\frac{4}{5}$ miles

   (C) $\frac{4}{5}$ mile

   (D) $\frac{1}{5}$ mile

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5. Write the numbers in the boxes to complete the addition sentence.

   $3\frac{11}{12} + 1\frac{9}{12} = \boxed{4}\frac{\boxed{20}}{12} = \boxed{5}\frac{\boxed{8}}{12}$

6. **Part A**

   One way to find $5 - 2\frac{5}{6}$ is to subtract the fraction parts and the whole-number parts of the mixed numbers. Explain how you can rename 5 to use this method.

   Sample answer: 5 can be renamed as $4\frac{6}{6}$ so that the fraction part of $2\frac{5}{6}$ can be subtracted.

   Part B

   Another way to find $5 - 2\frac{5}{6}$ is to use equivalent fractions. Find the difference as an improper fraction. Then simplify the difference. Explain your work.

   Sample answer: 5 is equivalent to $\frac{30}{6}$ because $5 = \frac{6}{6} + \frac{6}{6} + \frac{6}{6} + \frac{6}{6} + \frac{6}{6} = \frac{30}{6}$. $2\frac{5}{6}$ is equivalent to $\frac{17}{6}$ because $2\frac{5}{6} = \frac{6}{6} + \frac{6}{6} + \frac{5}{6} = \frac{17}{6}$. $\frac{30}{6} - \frac{17}{6} = \frac{13}{6}$. $\frac{13}{6} = \frac{6}{6} + \frac{6}{6} + \frac{1}{6} = 1 + 1 + \frac{1}{6} = 2\frac{1}{6}$

   Find $2\frac{3}{10} + 1\frac{9}{10} + 2\frac{7}{10}$. Show your work.

   Sample answer: Add the fraction parts: $\frac{3}{10} + \frac{9}{10} + \frac{7}{10} = \frac{19}{10}$. $\frac{19}{10} = 1\frac{9}{10}$. Add the whole-number parts: $2 + 1 + 2 = 5$. Combine the parts: $5 + 1\frac{9}{10} = 6\frac{9}{10}$.

WORK SPACE

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EXIT TICKET

4.NF.3, 4.NF.3c

Now that you have mastered adding and subtracting mixed numbers, let's solve the problem in the Real-World Connection.

After Carol's party, there were $\frac{11}{4}$ sandwiches left on one tray, $\frac{21}{4}$ sandwiches left on another tray, and $\frac{13}{4}$ sandwiches left on a third tray. How many sandwiches were left after the party?

Add the mixed numbers to find the solution.

After Carol's party, there were $5\frac{1}{4}$ sandwiches left.

The mixed numbers can be added to find the total: $\frac{11}{4} + 2\frac{1}{4} + 1\frac{3}{4} = ?$

First add the fractions: $\frac{1}{4} + \frac{1}{4} + \frac{3}{4} = \frac{5}{4} = 1\frac{1}{4}$

Then add the whole numbers: $1 + 2 + 1 = 4$

Add the two parts: $4 + 1\frac{1}{4} = 5\frac{1}{4}$

Carol had $5\frac{1}{4}$ sandwiches left after the party.

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THINK ABOUT IT

How is using a fraction model helpful in multiplying fractions?

EXAMPLE

Step One Show $\frac{2}{3}$ using a fraction model.

The model is $\frac{2}{3}$ shaded. Each shaded part of the model is $\frac{1}{3}$.



There are 2 shaded parts.

Step Two Show $\frac{2}{3}$ as the sum of unit fractions.

$\frac{2}{3} = \frac{1}{3} + \frac{1}{3}$

Step Three Show $\frac{2}{3}$ as the product of a whole number and a fraction.

$\frac{2}{3} = 2 \times \frac{1}{3}$

You can use a model to show the product of a whole number and a fraction. The whole-number factor tells you the number of groups. The fraction factor tells you the number and size of the parts in each group.

TURN AND TALK

Think about the problem from the beginning of the lesson. Do you think knowing how to use fraction bars will help solve the problem at the beginning of the lesson?

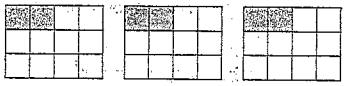
EXAMPLE

Show the expression $3 \times \frac{2}{12}$ using fraction models.

Step One Use the number of models to represent the whole number: 3.

Step Two Use the total number of parts to show the denominator: 12.

Step Three Shade in the amount of the numerator, which is 2.



Step Four Solve. Show the equation that the models represent.

$3 \times \frac{2}{12} = \frac{6}{12}$

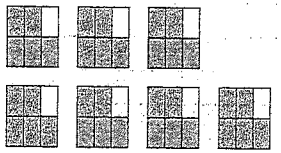
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GUIDED INSTRUCTION

1. Find the product of $7 \times \frac{5}{6}$.

Step One Draw a model.

The model should have 7 wholes. $\frac{5}{6}$ of each whole is shaded.



TURN AND TALK

$7 \times \frac{6}{6} = 7$

How close to 7 do you think $7 \times \frac{5}{6}$ will be?

Step Two Find the numerator.

The numerator of the product is the total number of shaded parts.

$7 \times \frac{5}{6} = \frac{35}{?}$

Step Three Find the denominator.

The denominator of the product is the number of parts in 1 whole.

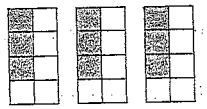
$7 \times \frac{5}{6} = \frac{35}{6}$

Step Four Write the product as a mixed number.

$\frac{35}{6} = \frac{30}{6} + \frac{5}{6} = 5\frac{5}{6}$

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2. What multiplication equation does the model show? Find the product.



Step One How many models are there?

There are [3] models.

Step Two What fraction of each model is shaded? $\frac{3}{8}$ is shaded.

[3] $\times \frac{3}{8}$

Step Three How many parts are shaded in all?

There are [9] shaded parts.

$3 \times \frac{3}{8} = \frac{[9]}{?}$

Step Four Find the denominator.

Each whole is divided into 8 equal parts.

$3 \times \frac{3}{8} = \frac{9}{[8]}$

HINT, HINT

Remember that the denominator of a whole number is 1, so the denominator of a fraction being multiplied by a whole number should not change.

3. Select TWO equations that are correct.

Ⓐ $\frac{2}{3} \times 4 = \frac{2}{12}$

Ⓑ $\frac{2}{3} \times 4 = 2\frac{2}{3}$

Ⓒ $\frac{3}{10} \times 3 = \frac{9}{10}$

Ⓓ $5 \times \frac{1}{2} = \frac{5}{10}$

Ⓔ $4 \times \frac{1}{5} = \frac{5}{5}$

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How Am I Doing?

What questions do you have?

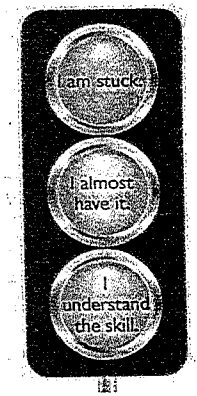
How can you use fraction models to show multiplication of fractions?

What is one way you can use your knowledge of multiplying fractions and whole numbers in the real world?

SKETCH IT

Brianna divided 4 pieces of paper into sixths. She shaded $\frac{2}{6}$ of each piece of paper. In the margin below, draw a model to show what fraction of the papers she shaded. How much of the paper did she shade?

Color in the traffic signal that shows how you are doing with the skill.



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INDEPENDENT PRACTICE

Answer the questions.

TIPS AND TRICKS

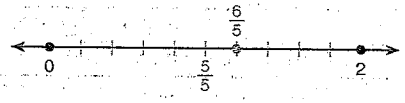
Sometimes there is more than one correct way to write an answer. The test may specify the form of your answer, such as a mixed number or a fraction in simplest form.

1. Write the product of $\frac{3}{5} \times 3$ as a mixed number.

   Write your answer in the box.

   $1\frac{4}{5}$

2. Draw lines to divide the number line. Then draw and label a point at the product of $3 \times \frac{2}{5}$.



3. Circle THREE of the expressions that have a product equal to $\frac{5}{4}$.

   $5 \times \frac{1}{4}$ $4 \times \frac{1}{5}$ $2 \times \frac{5}{8}$ $3 \times \frac{2}{4}$ $10 \times \frac{1}{8}$

4. Write the fraction in the box that makes the equation true.

   $4 \times \boxed{\frac{1}{12}} = \frac{1}{3}$

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5. Travis is running a relay race. Each person on the team will run $\frac{3}{5}$ mile. There are 4 people on the team. What is the total distance of the race?

   Write your answer as a mixed number in the boxes.

   $2\frac{2}{5}$ miles

6. Part A

   Which product is greatest?

   Ⓐ $3 \times \frac{1}{5}$

   Ⓑ $3 \times \frac{7}{8}$

   Ⓒ $3 \times \frac{2}{4}$

   Ⓓ $3 \times \frac{5}{8}$

Part B

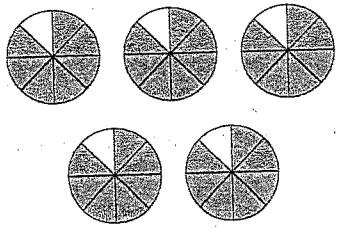
Explain how you can find the answer to Part A without calculating each product.

Sample answer: Each of the fractions is multiplied by the same whole number, 3. Therefore, the greatest fraction, $\frac{7}{8}$, leads to the greatest product.

WORK SPACE

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7 What multiplication equation does the model show? Explain how you know your answer is correct.



Sample answer: $5 \times \frac{7}{8} = \frac{35}{8}$. There are 5 fraction circles, so the whole-number factor is 5. Each fraction circle has 8 sections with 7 shaded sections, so the fraction factor is $\frac{7}{8}$. There are 35 shaded sections, so the numerator of the product is 35, and the denominator is the same as the denominator in the fraction factor, 8.

8 Write the numbers in the boxes to complete the equations.

▶ HINT, HINT

Think about how you could write the products as equivalent fractions.

$4 \times \square = 2$ (box: $\frac{1}{2}$)

$3 \times \square = \frac{3}{4}$ (box: $\frac{1}{4}$)

$8 \times \square = 2$ (box: $\frac{1}{4}$)

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EXIT TICKET

4.NF.4, 4.NF.4a, 4.NF.4b

Now that you have mastered multiplying fractions by whole numbers, let's solve the problem in the Real-World Connection.

Uma made sand art using green, red, blue, pink, and white sand. She used $\frac{2}{3}$ of a cup of each color. How much sand did she use in all?

Uma used $3\frac{1}{3}$ cups of sand in all.

There are 5 colors and Uma used $\frac{2}{3}$ of each color.

$5 \times \frac{2}{3} =$

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

Or

$5 \times \frac{2}{3} = \frac{(5 \times 2)}{3} = \frac{10}{3} = 3\frac{1}{3}$

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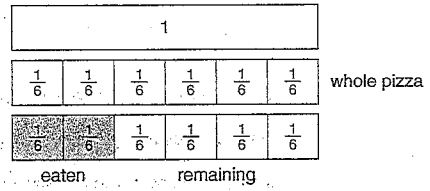
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EXAMPLE

The phrase *how much is left* is a word clue. It tells us that we need to subtract to find the difference when a number of items is taken away from a group.

Max has 1 whole pizza cut into 6 slices. He eats $\frac{2}{6}$ of the pizza.

How much of the pizza is left?



The model shows one whole divided into sixths.

The amount Max ate, $\frac{2}{6}$, is shaded.

The equation that represents the model is $\frac{6}{6} - \frac{2}{6} = \frac{4}{6}$.

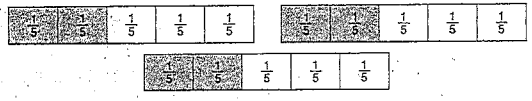
So, $\frac{4}{6}$ of the pizza is left.

EXAMPLE

The phrase *of each* is a word clue. It tells us to multiply to combine equal groups.

Ruth has $\frac{2}{5}$ yard of each of 3 different types of rope.

How much rope does Ruth have?



The model shows three groups of $\frac{2}{5}$.

The equation that represents the model is $3 \times \frac{2}{5} = \frac{2}{5} + \frac{2}{5} + \frac{2}{5} = \frac{(3 \times 2)}{5} = \frac{6}{5}$.

So, Ruth has $\frac{6}{5}$ yards of rope.

TURN AND TALK

With a partner, discuss Willa's problem from the beginning of the lesson. Identify any word clues. Which operation do you think you will use to solve the problem?

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GUIDED INSTRUCTION

1. Ruby's bean plant grew $\frac{5}{8}$ inch one week and $\frac{2}{8}$ inch another week. How much more did Ruby's bean plant grow in the first week than in the second?

Look for word clues to identify the operation.

Subtract to find the difference when two groups are compared.

Write an equation and solve.

$\frac{5}{8}$ [−] $\frac{2}{8}$ = [$\frac{3}{8}$]

Ruby's bean plant grew [$\frac{3}{8}$] inch more in the first week than in the second.

SKETCH IT

You can draw a model to help you solve the problem. Draw fraction bars for each fraction. Find the difference.

2. For 5 days each week, Micah practices soccer $\frac{1}{2}$ hour. How many hours does Micah practice soccer each week?

Look for word clues to identify the operation.

Multiply to find 5 groups of $\frac{1}{2}$.

Write an equation and solve.

5 [×] $\frac{1}{2}$ = [$\frac{5}{2}$]

Micah practices soccer for [$2\frac{1}{2}$] hours each week.

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3. Sheryl cuts a pie into 8 equal slices. She eats $\frac{3}{8}$ of the pie on Friday and $\frac{5}{8}$ more over the weekend. How much pie has she eaten in all?

Identify the operation.

Add to combine groups.

Write an equation and solve.

$\frac{3}{8}$ + $\frac{5}{8}$ = $\frac{8}{8}$

Sheryl ate 1 pie.

SKETCH IT

Draw a picture to help you find out how many apples each person eats. Then find which statements are true.

4. Heidi buys 6 apples and cuts each apple into thirds. Ramon buys 9 apples and cuts each apple in half. They each eat one piece of their apple each day.

Is each statement true? Select THREE answers.

- (A) Heidi and Ramon have the same number of apple pieces.
- (B) Heidi takes 9 days to eat her apples.
- (C) It takes Ramon 4 days to eat 2 apples.
- (D) Ramon takes 12 days to eat his apples.
- (E) Heidi takes 18 days to eat her apples.

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How Am I Doing?

What questions do you have?

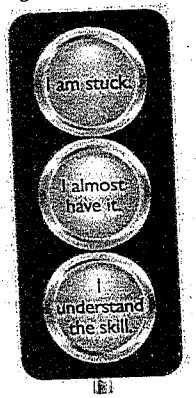
Describe a situation in which you need to add fractions to solve a problem.

What is an example of a real-life problem that can be solved by multiplying a whole number and a fraction? Could you also add to find the solution? Explain why or why not.

TURN AND TALK

When Tyler gets home from school, he spends $\frac{3}{5}$ of the next hour on homework. The rest of the hour he spends eating a snack. Work with a partner to find what fraction shows the number of hours he spends eating a snack during a school week. Explain how you solved the problem.

Color in the traffic signal that shows how you are doing with the skill.



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INDEPENDENT PRACTICE

Answer the questions.

SKETCH IT

Read the question and draw a picture. What do you know? What do you need to find out? What operation can you use to find the answer?

WORK SPACE

1. It is $\frac{5}{6}$ of a mile from Chloe's house to the library. Chloe has biked $\frac{1}{6}$ of a mile so far. How much farther does Chloe need to go to reach the library?

   Ⓐ $1\frac{1}{6}$ miles

   Ⓑ 1 mile

   Ⓒ $\frac{6}{12}$ mile

   Ⓓ $\frac{4}{6}$ mile

2. Mel's cat eats $\frac{3}{4}$ of a bag of cat food each month. How many bags of cat food does Mel's cat eat in 10 months?

   Write your answer in the box.

   $\frac{30}{4}$ or $7\frac{2}{4}$ bags

3. A bread recipe calls for $\frac{3}{4}$ cup rye flour, $\frac{2}{4}$ cup wheat flour, and $\frac{3}{4}$ cup white flour. In all, how much flour is in the bread?

   Ⓐ $2\frac{1}{4}$ cups

   Ⓑ 2 cups

   Ⓒ $1\frac{3}{4}$ cups

   Ⓓ $1\frac{2}{4}$ cups

4. Millie is making a poster for the science fair. She will use $\frac{1}{6}$ of the poster for the title and $\frac{3}{6}$ of the poster for a diagram of her experiment. The rest of the poster will be used for the results of her experiment. How much of the poster will Millie use for the results?

   Write your answer in the box.

   $\frac{2}{6}$

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5. Part A

   Jonah is decorating a cake. He uses vanilla frosting on $\frac{1}{5}$ of the cake, lemon frosting on $\frac{2}{5}$ of the cake, and chocolate frosting on the rest of the cake. What part of the cake has chocolate frosting?

   Write your answer in the box.

   $\frac{2}{5}$

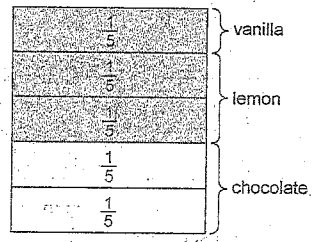
   Part B

   Draw a model to represent the cake. Write an equation to show the part of the cake with vanilla or lemon frosting. Write an equation to show the part of the cake with chocolate frosting.

   Sample answer:

   $\frac{1}{5} + \frac{2}{5} = \frac{3}{5}$ = the part of the cake with vanilla and lemon frosting

   $\frac{5}{5} - \frac{3}{5} = \frac{2}{5}$ = the part of the cake with chocolate frosting



WORK SPACE

6. Part A

   Lionel reads a book for $\frac{2}{3}$ hour. Amy reads 2 times longer than Lionel. Draw a model to represent how long Amy reads.

   Sample answer:



2 groups of $\frac{2}{3} = \frac{4}{3}$

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Part B

For how long does Amy read? Write an equation that represents the model you drew. Explain your answer.

Sample answer: I can multiply $\frac{2}{3}$ by 2 to find 2 times $\frac{2}{3}$ hour. $2 \times \frac{2}{3} = \frac{4}{3}$, or 1 whole hour and $\frac{1}{3}$ hour. Amy reads for $1\frac{1}{3}$ hours.

TIPS AND TRICKS

Be sure that your answer matches the question that was asked.

Sasha cuts his oranges into 6 equal slices. He eats 4 slices each day. Sam cuts his oranges into 8 equal slices. He eats 4 slices each day. Is each statement true? Select THREE answers.

- (A) It takes Sasha 3 days to eat 2 oranges.
- (B) In 4 days, Sam eats 2 oranges.
- (C) Sam will finish his oranges in 32 days.
- (D) Sasha will finish his oranges in 24 days.
- (E) Sasha will finish his oranges before Sam.

8. **Part A**

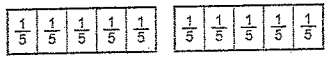
Wendy has several cartons of milk in her refrigerator. If she drinks $\frac{1}{5}$ of a carton each day, how much milk does she drink in 10 days? Write your answer in the box.

2 cartons

Part B

Explain or show how you solved the problem.

Sample answer: I multiplied one fifth by 10 days, which equals two wholes. So, Wendy drinks 2 cartons of milk in 10 days.



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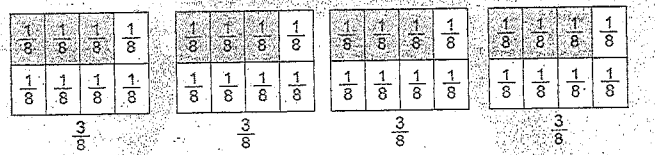
EXIT TICKET

4.NF.3, 4.NF.4c, 4.NF.4, 4.NF.4c

Now that you have mastered solving fraction word problems, let's solve the problem in the Real-World Connection.

Willa is a runner on a relay team. In an upcoming race, each team member will run $\frac{3}{8}$ of a mile. If there are 4 runners, how long is the race?

Shade and label the visual model below to show how to solve the problem. Then write the answer on the lines.



The race is $1\frac{4}{8}$ miles long.

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3. Find the sum of $\frac{2}{10} + \frac{13}{100}$.

Step One Write $\frac{2}{10}$ as an equivalent fraction with a denominator of 100.

$$\frac{2}{10} = \frac{2 \times 10}{10 \times 10} = \frac{20}{100}$$

Step Two Add fractions with like denominators.

$$\frac{20}{100} + \frac{13}{100} = \frac{33}{100}$$

So, $\frac{2}{10} + \frac{13}{100} = \frac{33}{100}$.

TIPS AND TRICKS

Look at the format of the answer choices and what makes one different from the others. See if any answer choices can be immediately eliminated.

4. Which of the following are equivalent to the addition expression $\frac{1}{10} + \frac{1}{100}$? Select THREE answers.

Ⓐ $\frac{10}{10} + \frac{1}{100}$

Ⓑ 0.1 + 0.01

Ⓒ $\frac{10}{100} + \frac{1}{100}$

Ⓓ $\frac{11}{100}$

Ⓔ 10 + 0.01

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How Am I Doing?

What questions do you have?

What are some examples of decimals you use in your everyday life?

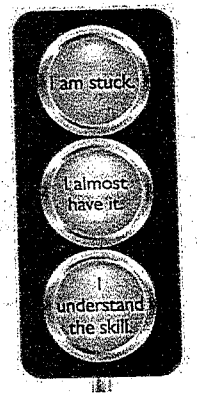
Fractions and decimals both name part of a whole. Do you think you see more fractions or more decimals in your everyday life?

Where are fractions used more often, and where are decimals used more often?

TURN AND TALK

Simon has a bag of marbles. In the bag, 0.07 of the marbles are blue. What fraction of the marbles are not blue? Work with a partner to explain how to solve the problem.

Color in the traffic signal that shows how you are doing with the skill.



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INDEPENDENT PRACTICE

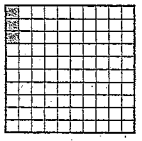
Answer the questions.

HINT, HINT

The number of digits to the right of the decimal point tells the number of zeros in the denominator.

WORK SPACE

1. What fraction and decimal does the model show?



Ⓐ $\frac{3}{10}$ and 0.3

Ⓑ $\frac{3}{10}$ and 0.03

Ⓒ $\frac{3}{100}$ and 0.3

Ⓓ $\frac{3}{100}$ and 0.03

2. $\frac{2}{10} + \frac{16}{100} = ?$ Write your answer in the box.

$\frac{36}{100}$

3. Select TWO decimal numbers that are equivalent to $\frac{3}{10}$.

Ⓐ 0.03

Ⓑ 0.3

Ⓑ 3.0

Ⓒ 0.30

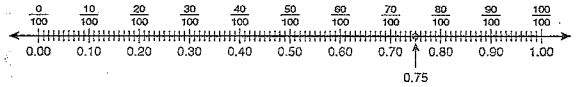
Ⓓ 0.13

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4. Write the numbers in the boxes to complete the sum of $\frac{3}{10} + \frac{15}{100}$.

$\frac{3}{10} + \frac{15}{100} = \frac{45}{100}$

5. Label the number line with decimals that are equivalent to the fractions. Locate and label 0.75 on the number line.



6. What is twenty-one hundredths written as a fraction and a decimal number?

Write your answers in the boxes.

Fraction: $\frac{21}{100}$

Decimal: 0.21

7. Which is nine tenths written as a decimal number?

Ⓐ 0.09

Ⓑ 0.9

Ⓒ 9.0

Ⓓ 90

WORK SPACE

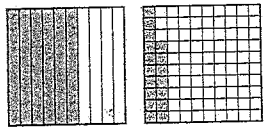
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WORK SPACE

8. Which of the following are equivalent to forty hundredths? Select the FOUR correct answers.

Ⓐ $\frac{4}{10}$ Ⓑ 0.04
Ⓒ $\frac{40}{100}$ Ⓓ 0.4
Ⓔ 0.40 Ⓕ $\frac{4}{100}$

9. Write an equation to show the total shown in the two grids. Explain your answer.



Sample answer: The first grid shows $\frac{6}{10}$, but if the grid were divided in hundredths, there would be $\frac{60}{100}$. The second grid shows $\frac{17}{100}$. So, there is a total of $\frac{77}{100}$. $\frac{6}{10} + \frac{17}{100} = \frac{77}{100}$.

10. Part A

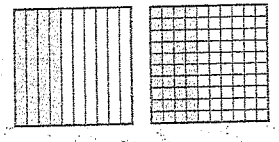
Lydia and Ray are at school. The community center is 0.4 mile from the school. Lydia says she will walk 40 hundredths of a mile to the community center. Ray says he will walk 4 tenths of a mile to the community center. Who is correct? How do you know?

Sample answer: Both are correct. 0.4 is four tenths, which is equal to $\frac{40}{100}$.

Part B

Draw a model to explain your answer.

Sample answer: four tenths = forty hundredths



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EXIT TICKET

4.NF.5, 4.NF.6

Now that you have mastered working with equivalent fractions and decimals, let's solve the problem in the Real-World Connection.

The fourth-grade classes are painting square tiles. The tiles will be used to make a mural. Ms. Brown's class has painted $\frac{4}{10}$ of the tiles. Ms. Clark's class has painted $\frac{27}{100}$ of the tiles. What fraction of the mural is complete?

$\frac{4}{10} + \frac{27}{100} = ?$

Write your answer as a fraction and a decimal.

$\frac{67}{100}$, $\frac{67}{100}$ = 0.67 of the mural is complete.

Write $\frac{4}{10}$ as an equivalent fraction with a denominator of 100.

$\frac{4}{10} = \frac{40}{100}$

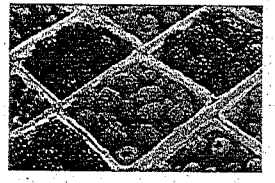
$\frac{40}{100} + \frac{27}{100} = \frac{67}{100}$

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You can compare decimals by comparing equal-size parts.

EXAMPLE

Compare 0.50 and 0.5. Compare equal-size parts.

0.50	0.5
0.50 is 50 hundredths.	0.5 is 5 tenths.
	5 tenths is equivalent to 50 hundredths.

50 hundredths is equal to 50 hundredths.

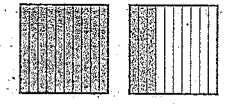
Therefore, 0.50 = 0.5.

GUIDED INSTRUCTION

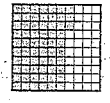
Fruit is often packaged and sold by weight. You can compare weights to determine which package holds more fruit.

1. Which container of raspberries is greater, 1.3 pounds or 0.63 pounds?

Step One Shade a model for 1.3.



Step Two Shade a model for 0.63.



Step Three Compare the decimals by looking to see which model has the greater shaded part.

1.3 has the greater shaded part.

Step Four Write a comparison statement.

1.3 > 0.63

SKETCH IT

Draw these two numbers on a number line. Which number is on the left?

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2. Compare 0.5 and 0.54. Write <, >, or =.

Step One Write both numbers in a place-value chart.

ones	.	tenths	hundredths
0	.	5	
0	.	5	4

Step Two Compare the digits in the greatest place-value position first and then the smaller place values.

The digits in the ones place are the same.

The digits in the tenths place are the same.

0 hundredths is less than 4 hundredths.

Step Three Write a comparison statement.

0.5 [<] 0.54

TURN AND TALK

On a hundred grid, how would the shaded part of 0.5 compare to the shaded part of 0.54?

3. Determine if each decimal less than or greater than 0.28.

0.2 [<] 0.28

0.19 [<] 0.28

1.02 [>] 0.28

HINT, HINT

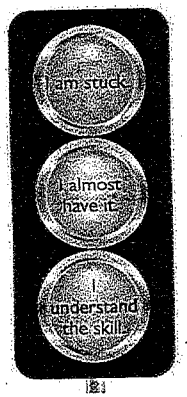
- Work from left to right. Compare the digits with the same place value. Continue comparing digits until you find two digits that are not equal.

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TURN AND TALK

Working in a small group, decorate a poster board illustrating your answer to the following question: What are the differences and similarities between seven-tenths and seventy-hundredths? In your illustrations, use words, numbers, decimals, fractions, and diagrams to show how the two fractions are similar and different. When you are finished, present your poster to the class.

Color in the traffic signal that shows how you are doing with the skill.



How Am I Doing?

What questions do you have?

When is a time when you would need to compare decimals in your everyday life?

Many different measurements are recorded as decimals. Give several examples and tell about a situation where you might compare the measurements.

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INDEPENDENT PRACTICE

Answer the questions.

1. Write the symbol in the box that correctly completes the comparison.

   0.23 [<] 0.26

2. Tori hiked 2.13 miles. Dinah hiked farther than Tori. Which could be the number of miles Dinah hiked?

   (A) 1.95 miles
   (B) 2.3 miles
   (C) 2.1 miles
   (D) 2.12 miles

3. Select THREE numbers that are greater than 0.89.

   (A) 0.98
   (B) 0.88
   (C) 0.90
   (D) 0.99
   (E) 0.80
   (F) 0.89

4. Which number is equal to 0.6?

   (A) 1.6
   (B) 1.60
   (C) 0.60
   (D) 0.06

5. Which number is less than 3.65?

   (A) 3.56
   (B) 3.7
   (C) 4.05
   (D) 3.66

HINT, HINT

The comparison symbol points to the lesser number.

WORK SPACE

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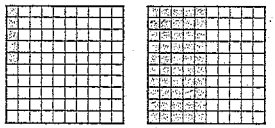
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WORK SPACE

6. Write the symbol in the box that correctly completes the comparison.

1.7 [=] 1.70

7. Harry has 0.05 dollars. Pauline has 0.5 dollars. Who has more money? Shade the models to show each decimal. Explain your answer.



Harry Pauline

Sample answer: 0.05 = 5 hundredths
0.5 = 5 tenths = 50 hundredths
5 hundredths < 50 hundredths
0.05 < 0.5 Pauline has more money.

8. Use place value to compare the numbers. Order each step from 1–4.

ones	.	tenths	hundredths
0	.	4	7
0	.	4	3

Order	Step
2	Compare the tenths. 4 = 4
1	Compare the ones. 0 = 0
4	0.47 > 0.43
3	Compare the hundredths. 7 > 3

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9. Select THREE numbers that are less than 4.24.

Ⓐ 4.42
Ⓑ 4.29
Ⓒ 4.23
Ⓓ 3.99
Ⓔ 5.24
Ⓕ 4.14

10. Part A

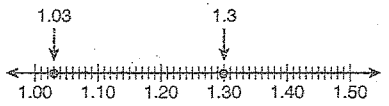
Explain how to use equal-size parts to compare 1.3 and 1.03.

Sample answer: 1.3 is 1 whole and 3 tenths, or 1 whole and 30 hundredths. 1.03 is 1 whole and 3 hundredths. The wholes are equal, so I can compare the hundredths. 30 hundredths is greater than 3 hundredths. So, 1.3 > 1.03.

Part B

Explain another way to compare the decimals 1.3 and 1.03.

Sample answer: I can locate 1.3 and 1.03 on a number line. Numbers that are closer to zero have a lesser value than numbers that are farther from zero. 1.3 is farther from zero than 1.03, so 1.3 > 1.03.



WORK SPACE

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EXIT TICKET

4.NF.7

Now that you have mastered comparing decimals, let's solve the problem in the Real-World Connection.

Claudia learns that a new area is being added to the city park. 0.3 of the new area will be a playground. 0.25 of the new area will be an enclosed dog run.

Will more of the new park area be playground or dog run?

Use a place-value chart to compare the decimals.

ones	.	tenths	hundredths	
0	.	3		←playground
0	.	2	5	←dog run

More of the new park will be a playground.

3 tenths > 2 tenths, so 0.3 > 0.25.

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