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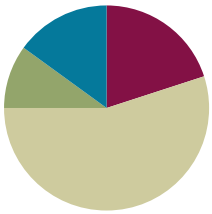
# Lesson 2

## Objective: Recognize a digit represents 10 times the value of what it represents in the place to its right.

### Suggested Lesson Structure

| | |
|---|---|
| Fluency Practice | (12 minutes) |
| Application Problem | (6 minutes) |
| Concept Development | (33 minutes) |
| Student Debrief | (9 minutes) |
| **Total Time** | **(60 minutes)** |



## Fluency Practice (12 minutes)

- Skip-Counting **3.OA.7** (4 minutes)
- Place Value **4.NBT.2** (4 minutes)
- Multiply by 10 **4.NB5.1** (4 minutes)

### Skip-Counting (4 minutes)

Note: Practicing skip-counting on the number line builds a foundation for accessing higher-order concepts throughout the year.

Direct students to count by threes forward and backward to 36, focusing on the crossing-ten transitions.

Example: (3, 6, 9, 12, 9, 12, 9, 12, 15, 18, 21, 18, 21, 24, 27, 30, 27, 30, 33, 30, 33, 30, 33, 36…). The purpose of focusing on crossing the ten transitions is to help students make the connection that, for example, when adding 3 to 9, 9 + 1 is 10, and then 2 more is 12.

There is a similar purpose in counting down by threes; 12 – 2 is 10, and subtracting 1 more is 9. This work builds on the fluency work of previous grade levels. Students should understand that when crossing the ten, they are regrouping.

Direct students to count by fours forward and backward to 48, focusing on the crossing-ten transitions.

### Place Value (4 minutes)

Materials: (S) Personal white board, unlabeled thousands place value chart (Lesson 1 Template)

Note: Reviewing and practicing place value skills in isolation prepares students for success in multiplying different place value units during the lesson.



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T: (Project the place value chart to the thousands place.) Show 5 tens as place value disks, and write the number below it.

S: (Draw 5 tens. Write 5 below the tens column and 0 below the ones column.)

T: (Draw to correct student misunderstanding.) Say the number in unit form.

S: 5 tens.

T: Say the number in standard form.

S: 50.

Continue for the following possible sequence: 3 tens 2 ones, 4 hundreds 3 ones, 1 thousand 2 hundreds, 4 thousands 2 tens, and 4 thousands 2 hundreds 3 tens 5 ones.

### Multiply by 10 (4 minutes)

Materials: (S) Personal white board

Note: This fluency activity reviews concepts learned in Lesson 1.

T: (Project 10 ones × 10 = 1 _____.) Fill in the blank.

S: (Write 10 ones × 10 = 1 hundred.)

T: Say the multiplication sentence in standard form.

S: 10 × 10 = 100.

Repeat for the following possible sequence: 10 × _____ = 2 hundreds; 10 × _____ = 3 hundreds; 10 × _____ = 7 hundreds; 10 × 1 hundred = 1 _____; 10 × ____ = 2 thousands; 10 × _____ = 8 thousands; 10 × 10 thousands = _____.

## Application Problem (6 minutes)

Amy is baking muffins. Each baking tray can hold 6 muffins.

a. If Amy bakes 4 trays of muffins, how many muffins will she have in all?

b. The corner bakery produced 10 times as many muffins as Amy baked. How many muffins did the bakery produce?

Extension: If the corner bakery packages the muffins in boxes of 100, how many boxes of 100 could they make?

a) 4 × 6 = 24
Amy will have 24 muffins in all.

b) 10 × 24 = 240
The bakery produced 240 muffins.

Extension: They could make 2 boxes of 100 muffins.

Note: This Application Problem builds on the concept from the previous lesson of *10 times as many*.



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## Concept Development (33 minutes)

Materials: (S) Personal white board, unlabeled millions place value chart (Template)

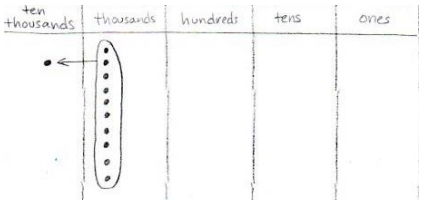
**Problem 1: Multiply single units by 10 to build the place value chart to 1 million. Divide to reverse the process.**

T: Label ones, tens, hundreds, and thousands on your place value chart.

T: On your personal white board, write the multiplication sentence that shows the relationship between 1 hundred and 1 thousand.

S: (Write 10 × 1 hundred = 10 hundreds = 1 thousand.)

T: Draw place value disks on your place value chart to find the value of 10 times 1 thousand.




T: (Circulate.) I saw that Tessa drew 10 disks in the thousands column. What does that represent?

S: 10 times 1 thousand equals 10 thousands. (10 × 1 thousand = 10 thousands.)

T: How else can 10 thousands be represented?

S: 10 thousands can be bundled because, when you have 10 of one unit, you can bundle them and move the bundle to the next column.

T: (Point to the place value chart.) Can anyone think of what the name of our next column after the thousands might be? (Students share. Label the **ten thousands** column.)

T: Now, write a complete multiplication sentence to show 10 times the value of 1 thousand. Show how you regroup.

S: (Write 10 × 1 thousand = 10 thousands = 1 ten thousand.)

T: On your place value chart, show what 10 times the value of 1 ten thousand equals. (Circulate and assist students as necessary.)

T: What is 10 times 1 ten thousand?

S: 10 ten thousands. → 1 **hundred thousand**.

T: That is our next larger unit. (Write 10 × 1 ten thousand = 10 ten thousands = 1 hundred thousand.)

T: To move another column to the left, what would be my next 10 times statement?

S: 10 times 1 hundred thousand.

T: Solve to find 10 times 1 hundred thousand. (Circulate and assist students as necessary.)

T: 10 hundred thousands can be bundled and represented as **1 million**. Title your column, and write the multiplication sentence.

S: (Write 10 × 1 hundred thousand = 10 hundred thousands = 1 million.)

**NOTES ON MULTIPLE MEANS OF REPRESENTATION:**

Scaffold student understanding of the place value pattern by recording the following sentence frames:

- 10 × 1 one is 1 ten
- 10 × 1 ten is 1 hundred
- 10 × 1 hundred is 1 thousand
- 10 × 1 thousand is 1 ten thousand
- 10 × 1 ten thousand is 1 hundred thousand

Students may benefit from speaking this pattern chorally. Deepen understanding with prepared visuals (perhaps using an interactive whiteboard).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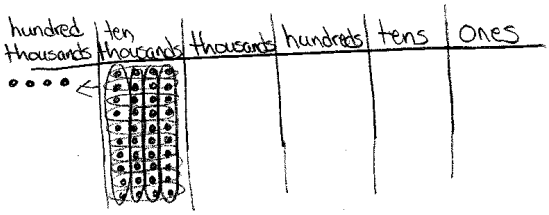
After having built the place value chart by multiplying by ten, quickly review the process simply moving from right to left on the place value chart and then reversing and moving left to right (e.g., 2 tens times 10 equals 2 hundreds; 2 hundreds times 10 equals 2 thousands; 2 thousands divided by 10 equals 2 hundreds; 2 hundreds divided by 10 equals 2 tens).

**Problem 2: Multiply multiple copies of one unit by 10.**

T: Draw place value disks, and write a multiplication sentence to show the value of 10 times 4 ten thousands.

T: 10 times 4 ten thousands is…?

S: 40 ten thousands. → 4 hundred thousands.




T: (Write 10 × 4 ten thousands = 40 ten thousands = 4 hundred thousands.) Explain to your partner how you know this equation is true.

Repeat with 10 × 3 hundred thousands.

**Problem 3: Divide multiple copies of one unit by 10.**

T: (Write 2 thousands ÷ 10.) What is the process for solving this division expression?

S: Use a place value chart. → Represent 2 thousands on a place value chart. Then, change them for smaller units so we can divide.

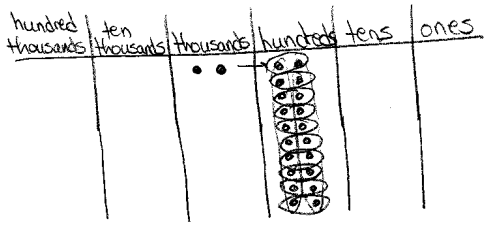
T: What would our place value chart look like if we changed each thousand for 10 smaller units?

S: 20 hundreds. → 2 thousands can be changed to be 20 hundreds because 2 thousands and 20 hundreds are equal.

T: Solve for the answer.

MP.1

S: 2 hundreds. → 2 thousands ÷ 10 is 2 hundreds because 2 thousands unbundled becomes 20 hundreds. → 20 hundreds divided by 10 is 2 hundreds. → 2 thousands ÷ 10 = 20 hundreds ÷ 10 = 2 hundreds.




Repeat with 3 hundred thousands ÷ 10.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**Problem 4: Multiply and divide multiple copies of two different units by 10.**

T: Draw place value disks to show 3 hundreds and 2 tens.

T: (Write 10 × (3 hundreds 2 tens).) Work in pairs to solve this expression. I wrote 3 hundreds 2 tens in parentheses to show it is one number. (Circulate as students work. Clarify that both hundreds and tens must be multiplied by 10.)

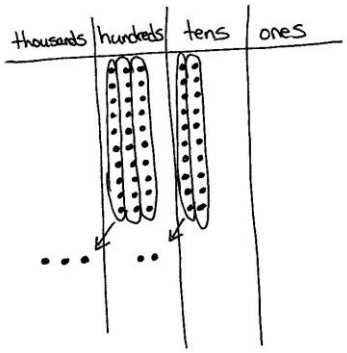
T: What is your product?

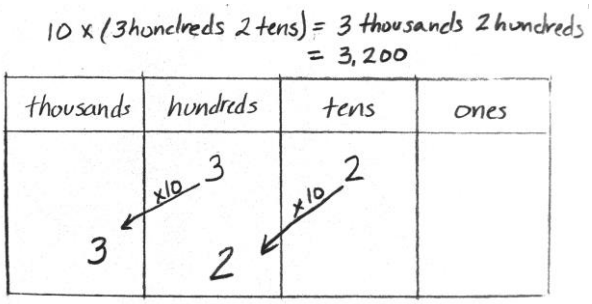
S: 3 thousands 2 hundreds.

T: (Write 10 × (3 hundreds 2 tens) = 3 thousands 2 hundreds.) How do we write this in standard form?

S: 3,200.

T: (Write 10 × (3 hundreds 2 tens) = 3 thousands 2 hundreds = 3,200.)

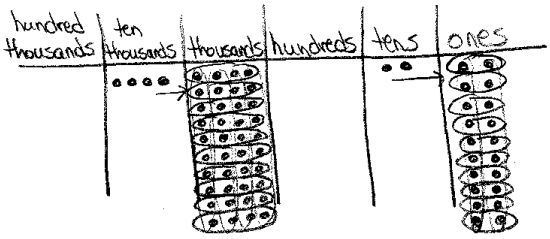


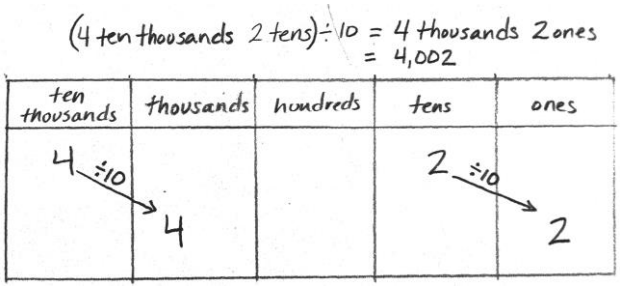




T: (Write (4 ten thousands 2 tens) ÷ 10.) In this expression, we have two units. Explain how you will find your answer.

S: We can use the place value chart again and represent the unbundled units and then divide. (Represent in the place value chart, and record the number sentence (4 ten thousands 2 tens) ÷ 10 = 4 thousands 2 ones = 4,002.)

T: Watch as I represent numbers in the place value chart to multiply or divide by ten instead of drawing disks.




Repeat with 10 × (4 thousands 5 hundreds) and (7 hundreds 9 tens) ÷ 10.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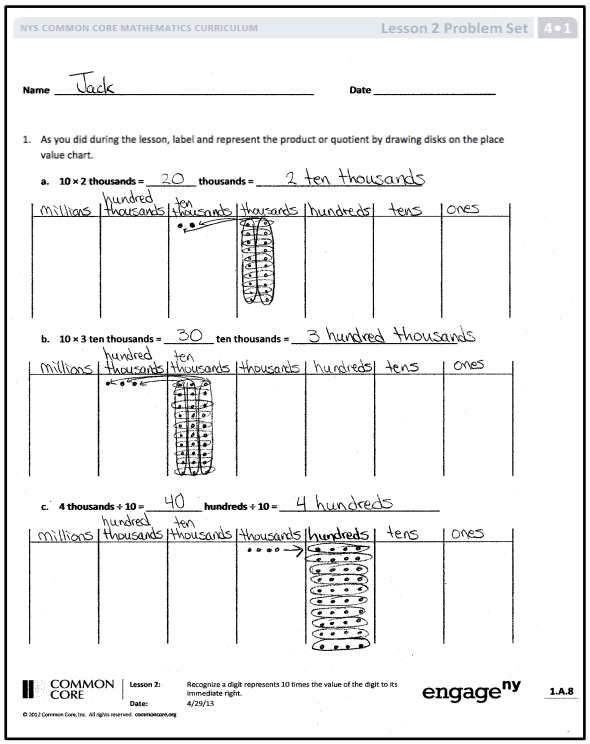
## Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first. Some problems do not specify a method for solving. Students should solve these problems using the RDW approach used for Application Problems.



NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 2 Problem Set 4•1

Name Jack Date

1. As you did during the lesson, label and represent the product or quotient by drawing disks on the place value chart.

a. 10 × 2 thousands = 20 thousands = 2 ten thousands

| millions | hundred thousands | ten thousands | thousands | hundreds | tens | ones |
|---|---|---|---|---|---|---|

b. 10 × 3 ten thousands = 30 ten thousands = 3 hundred thousands

| millions | hundred thousands | ten thousands | thousands | hundreds | tens | ones |
|---|---|---|---|---|---|---|

c. 4 thousands ÷ 10 = 40 hundreds ÷ 10 = 4 hundreds

| millions | hundred thousands | ten thousands | thousands | hundreds | tens | ones |
|---|---|---|---|---|---|---|

COMMON CORE Lesson 2: Recognize a digit represents 10 times the value of the digit to its immediate right. Date: 4/29/13 engage^ny 1.A.8

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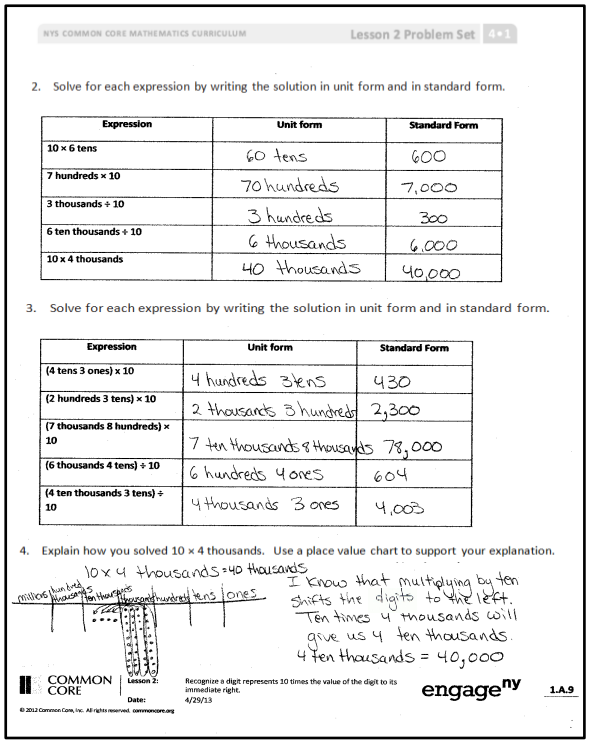
## Student Debrief (9 minutes)

**Lesson Objective:** Recognize a digit represents 10 times the value of what it represents in the place to its right.

Invite students to review their solutions for the Problem Set and the totality of the lesson experience. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Student Debrief. Guide students in a conversation to debrief the Problem Set.

Any combination of the questions below may be used to lead the discussion.

- How did we use patterns to predict the increasing units on the place value chart up to **1 million**? Can you predict the unit that is 10 times 1 million? 100 times 1 million?
- What happens when you multiply a number by 10? 1 **ten thousand** is what times 10? 1 **hundred thousand** is what times 10?
- Gail said she noticed that when you multiply a number by 10, you shift the digits one place to the left and put a zero in the ones place. Is she correct?
- How can you use multiplication and division to describe the relationship between units on the place value chart? Use Problem 1 (a) and (c) to help explain.
- Practice reading your answers in Problem 2 out loud. What similarities did you find in saying the numbers in unit form and standard form? Differences?



NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 2 Problem Set 4•1

2. Solve for each expression by writing the solution in unit form and in standard form.

| Expression | Unit form | Standard Form |
|---|---|---|
| 10 × 6 tens | 60 tens | 600 |
| 7 hundreds × 10 | 70 hundreds | 7,000 |
| 3 thousands ÷ 10 | 3 hundreds | 300 |
| 6 ten thousands ÷ 10 | 6 thousands | 6,000 |
| 10 × 4 thousands | 40 thousands | 40,000 |

3. Solve for each expression by writing the solution in unit form and in standard form.

| Expression | Unit form | Standard Form |
|---|---|---|
| (4 tens 3 ones) × 10 | 4 hundreds 3 tens | 430 |
| (2 hundreds 3 tens) × 10 | 2 thousands 3 hundreds | 2,300 |
| (7 thousands 8 hundreds) × 10 | 7 ten thousands 8 thousands | 78,000 |
| (6 thousands 4 tens) ÷ 10 | 6 hundreds 4 ones | 604 |
| (4 ten thousands 3 tens) ÷ 10 | 4 thousands 3 ones | 4,003 |

4. Explain how you solved 10 × 4 thousands. Use a place value chart to support your explanation.

10 × 4 thousands = 40 thousands

| millions | hundred thousands | ten thousands | thousands | hundreds | tens | ones |
|---|---|---|---|---|---|---|

I know that multiplying by ten shifts the digits to the left. Ten times 4 thousands will give us 4 ten thousands. 4 ten thousands = 40,000

COMMON CORE Lesson 2: Recognize a digit represents 10 times the value of the digit to its immediate right. Date: 4/29/13 engage^ny 1.A.9

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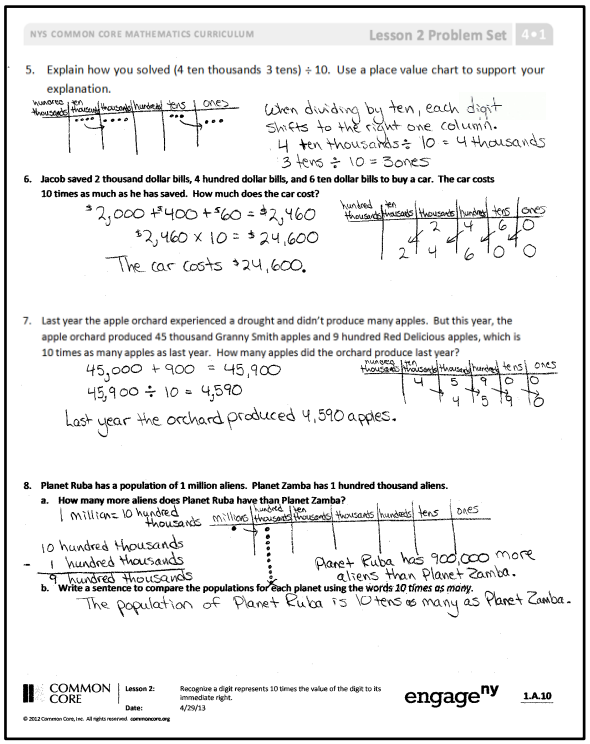
- In Problem 7, did you write your equation as a multiplication or division sentence? Which way is correct?
- Which part in Problem 3 was hardest to solve?
- When we multiply 6 tens times 10, as in Problem 2, are we multiplying the 6, the tens, or both? Does the digit or the unit change?
- Is 10 times 6 tens the same as 6 times 10 tens? (Use a place value chart to model.)
- Is 10 times 10 times 6 the same as 10 tens times 6? (Use a place value chart to model 10 times 10 is the same as 1 ten times 1 ten.)
- When we multiply or divide by 10, do we change the digits or the unit? Make a few examples.



NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 2 Problem Set 4•1

5. Explain how you solved (4 ten thousands 3 tens) ÷ 10. Use a place value chart to support your explanation.

When dividing by ten, each digit shifts to the right one column.
4 ten thousands ÷ 10 = 4 thousands
3 tens ÷ 10 = 3 ones

6. Jacob saved 2 thousand dollar bills, 4 hundred dollar bills, and 6 ten dollar bills to buy a car. The car costs 10 times as much as he has saved. How much does the car cost?

$2,000 + $400 + $60 = $2,460
$2,460 × 10 = $24,600
The car costs $24,600.

7. Last year the apple orchard experienced a drought and didn't produce many apples. But this year, the apple orchard produced 45 thousand Granny Smith apples and 9 hundred Red Delicious apples, which is 10 times as many apples as last year. How many apples did the orchard produce last year?

45,000 + 900 = 45,900
45,900 ÷ 10 = 4,590
Last year the orchard produced 4,590 apples.

8. Planet Ruba has a population of 1 million aliens. Planet Zamba has 1 hundred thousand aliens.
a. How many more aliens does Planet Ruba have than Planet Zamba?
1 million = 10 hundred thousands
10 hundred thousands
− 1 hundred thousands
9 hundred thousands
Planet Ruba has 900,000 more aliens than Planet Zamba.
b. Write a sentence to compare the populations for each planet using the words *10 times as many*.
The population of Planet Ruba is 10 times as many as Planet Zamba.

COMMON CORE Lesson 2: Recognize a digit represents 10 times the value of the digit to its immediate right. Date: 4/29/13 engage^ny 1.A.10

## Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help with assessing students' understanding of the concepts that were presented in today's lesson and planning more effectively for future lessons. The questions may be read aloud to the students.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Name _____ Date _____

1. As you did during the lesson, label and represent the product or quotient by drawing disks on the place value chart.

   a. 10 × 2 thousands = _____ thousands = _____

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | |

   b. 10 × 3 ten thousands = _____ ten thousands = _____

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | |

   c. 4 thousands ÷ 10 = _____ hundreds ÷ 10 = _____

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | |



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2. Solve for each expression by writing the solution in unit form and in standard form.

| Expression | Unit form | Standard Form |
|---|---|---|
| 10 × 6 tens | | |
| 7 hundreds × 10 | | |
| 3 thousands ÷ 10 | | |
| 6 ten thousands ÷ 10 | | |
| 10 × 4 thousands | | |

3. Solve for each expression by writing the solution in unit form and in standard form.

| Expression | Unit form | Standard Form |
|---|---|---|
| (4 tens 3 ones) × 10 | | |
| (2 hundreds 3 tens) × 10 | | |
| (7 thousands 8 hundreds) × 10 | | |
| (6 thousands 4 tens) ÷ 10 | | |
| (4 ten thousands 3 tens) ÷ 10 | | |

4. Explain how you solved 10 × 4 thousands. Use a place value chart to support your explanation.


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5. Explain how you solved (4 ten thousands 3 tens) ÷ 10. Use a place value chart to support your explanation.

6. Jacob saved 2 thousand dollar bills, 4 hundred dollar bills, and 6 ten dollar bills to buy a car. The car costs 10 times as much as he has saved. How much does the car cost?

7. Last year the apple orchard experienced a drought and did not produce many apples. But this year, the apple orchard produced 45 thousand Granny Smith apples and 9 hundred Red Delicious apples, which is 10 times as many apples as last year. How many apples did the orchard produce last year?



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8. Planet Ruba has a population of 1 million aliens. Planet Zamba has 1 hundred thousand aliens.
   a. How many more aliens does Planet Ruba have than Planet Zamba?

   b. Write a sentence to compare the populations for each planet using the words *10 times as many*.


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Name _____ Date _____

1. Fill in the blank to make a true number sentence. Use standard form.

   a. (4 ten thousands 6 hundreds) × 10 = _____

   b. (8 thousands 2 tens) ÷ 10 = _____

2. The Carson family saved up $39,580 for a new home. The cost of their dream home is 10 times as much as they have saved. How much does their dream home cost?



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Name _____ Date _____

1. As you did during the lesson, label and represent the product or quotient by drawing disks on the place value chart.

   a. 10 × 4 thousands = _____ thousands = _____

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | |

   b. 4 thousands ÷ 10 = _____ hundreds ÷ 10 = _____

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | |

2. Solve for each expression by writing the solution in unit form and in standard form.

| Expression | Unit Form | Standard Form |
|---|---|---|
| 10 × 3 tens | | |
| 5 hundreds × 10 | | |
| 9 ten thousands ÷ 10 | | |
| 10 × 7 thousands | | |



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3. Solve for each expression by writing the solution in unit form and in standard form.

| Expression | Unit Form | Standard Form |
|---|---|---|
| (2 tens 1 one) × 10 | | |
| (5 hundreds 5 tens) × 10 | | |
| (2 thousands 7 tens) ÷ 10 | | |
| (4 ten thousands 8 hundreds) ÷ 10 | | |

4. a. Emily collected $950 selling Girl Scout cookies all day Saturday. Emily's troop collected 10 times as much as she did. How much money did Emily's troop raise?

   b. On Saturday, Emily made 10 times as much as on Monday. How much money did Emily collect on Monday?



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unlabeled millions place value chart



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