IMKH California

GRADE 2

Student Edition

UNITS

7 | 8 | 9

Illustrative Mathematics® LEARN MATH FOR LIFE | Kendall Hunt

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UNIT 9 PUTTING IT ALL TOGETHER

GRADE 2

UNIT

7

Adding and Subtracting within 1,000

Content Connections

In this unit you will add and subtract within 1,000 using place value, the relationship between addition and subtraction and the properties of operations. You will make connections by:

- **Exploring Changing Quantities** while solving addition and subtraction problems without composing and decomposing a base-ten unit.
- **Discovering Shape and Space** while using number lines, base-ten blocks, base-ten diagrams and equations to make sense of sums and compare solutions.

- **Taking Wholes Apart, Putting Parts Together** while using place values to add and subtract 3-digit numbers.
- **Reasoning with Data** while interpreting data in different representations such as number lines, graphs and drawings.

Addressing the Standards

As you work your way through **Unit 7 Adding and Subtracting within 1,000,** you will use some mathematical practices that you may have started using in kindergarten and have continued strengthening over your school career. These practices describe types of thinking or behaviors that you might use to solve specific math problems.

Mathematical Practices	Where You Use these MPs
MP1 Make sense of problems and persevere in solving them.	Lesson 3, 5, 6, 11, 12, and 18
MP2 Reason abstractly and quantitatively.	Lesson 11, 13, and 15
MP3 Construct viable arguments and critique the reasoning of others.	Lesson 7, 8, 9, 10, 16, and 17
MP4 Model with mathematics.	Lesson 19
MP5 Use appropriate tools strategically.	Lesson 5
MP6 Attend to precision.	Lesson 6
MP7 Look for and make use of structure.	Lesson 1, 2, 4, 7, and 14
MP8 Look for and express regularity in repeated reasoning.	Lesson 1 and 2

The California Common Core State Standards for Mathematics (CA CCSSM) describe the topics you will learn in this unit. Many of these topics build upon knowledge you already have and challenge you to expand upon that knowledge. The table below shows what standards are being addressed in this unit.

Big Ideas You Are Studying	California Content Standards	Lessons Where You Learn This
• Dollars and Cents • Problem Solving with Measure • Skip Counting to 100	**2.NBT.1** Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases: a. 100 can be thought of as a bundle of ten tens—called a "hundred." B. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).	Lesson 14 and 16

Big Ideas You Are Studying	California Content Standards	Lessons Where You Learn This
• Represent Data • Dollars and Cents	**2.NBT.2** Count within 1000; skip-count by 2s, 5s, 10s, and 100s.	Lesson 1 and 15
• Number Strategies	**2.NBT.4** Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.	Lesson 16
• Dollars and Cents • Number Strategies	**2.NBT.5** Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.	Lesson 2 and 6
• Dollars and Cents • Number Strategies	**2.NBT.6** Add up to four two-digit numbers using strategies based on place value and properties of operations.	Lesson 11

Big Ideas You Are Studying	California Content Standards	Lessons Where You Learn This
• Dollars and Cents • Problem Solving with Measure • Skip Counting to 100 • Number Strategies	**2.NBT.7** Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.	Lesson 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, and 19
• Dollars and Cents • Problem Solving with Measure • Skip Counting to 100 • Number Strategies	**2.NBT.7.1** Use estimation strategies to make reasonable estimates in problem solving.	Lesson 17

Big Ideas You Are Studying	California Content Standards	Lessons Where You Learn This
• Skip Counting to 100	**2.NBT.8** Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.	Lesson 1, 4, 7, and 18
• Dollars and Cents • Skip Counting to 100	**2.NBT.9** Explain why addition and subtraction strategies work, using place value and the properties of operations.	Lesson 4, 8, 9, 10, 13, 14, 15, and 16

Addressing CA CCSSM 2.NBT.2, 2.NBT.7, 2.NBT.8; building towards 2.NBT.7; practicing MP7 and MP8

Compare, Count On, and Count Back

Let's compare numbers and add or subtract.

Warm-up

Number Talk: Count Back

Find the value of each expression mentally.

- 586 – 6
- 586 – 8
- 434 – 5
- 352 – 4

Activity 1

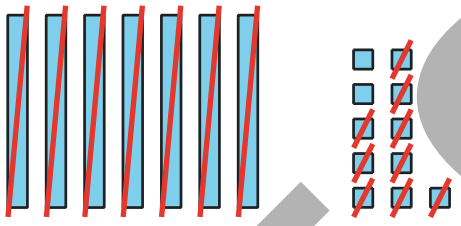
Notice the Difference

Tyler and Elena find the value of 81 – 79.

Tyler

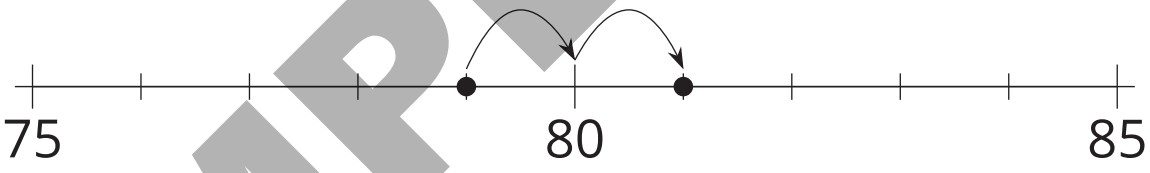
81 – 70 = 11

11 – 9 = 2



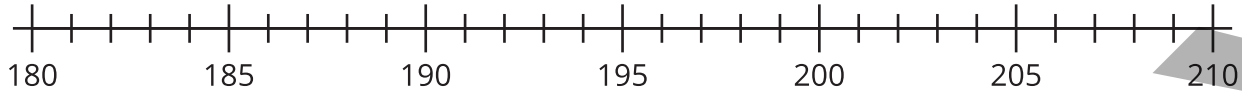
Elena

81 – 79 = 2



What do you notice? What do you wonder?

1. Locate and label 203 and 198.

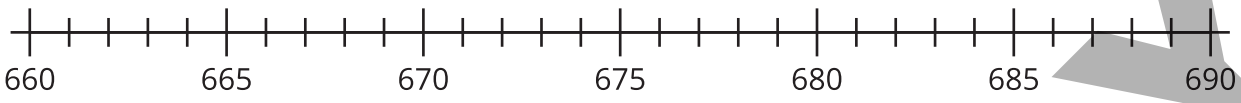


Compare, using <, >, or =.

_____ ☐ _____

Find the value of 203 – 198. Show your thinking, using drawings, numbers, or words.

2. Locate and label 673 and 680.



Sec A

Compare, using <, >, or =.

_____ □ _____

Find the value of 680 – 673. Show your thinking, using drawings, numbers, or words.

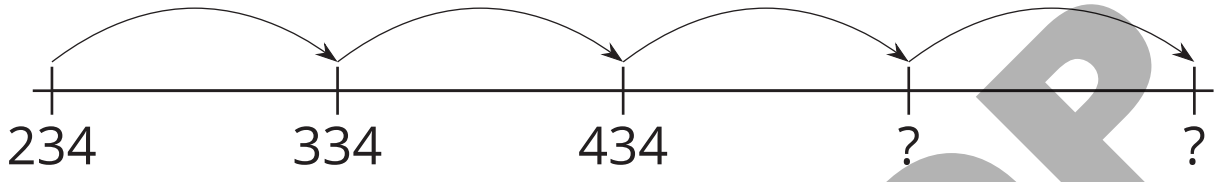
3. Locate and label 501 and 499.

Find the value of 501 – 499. Show your thinking, using drawings, numbers, or words.

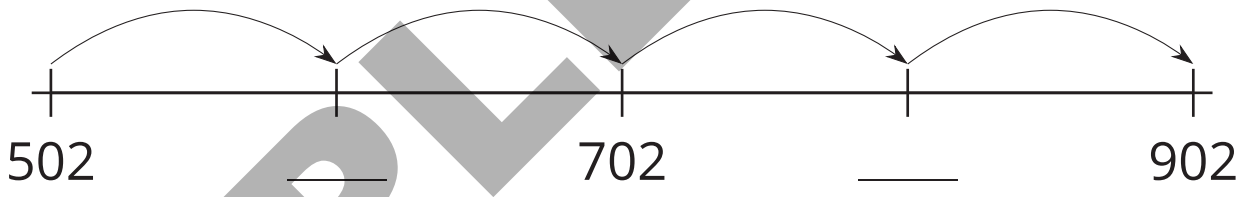
4. Find the value of 400 – 396. Show your thinking, using drawings, numbers, or words.

Activity 2

What's the Big Difference?

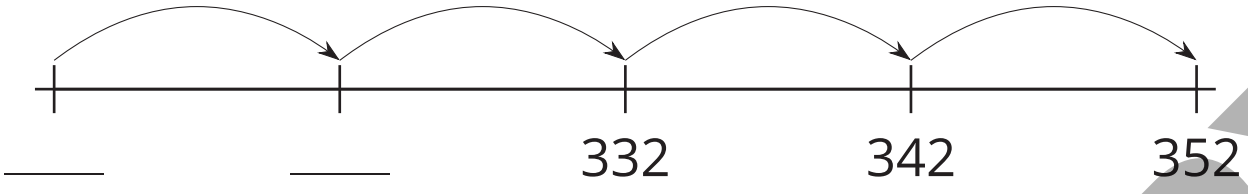


1. Fill in the missing numbers.



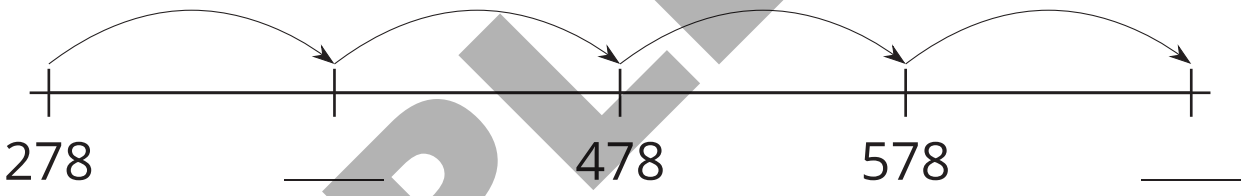
Does this number line show counting on by tens or counting on by hundreds?

2. Fill in the missing numbers.



Does this number line show counting on by tens or counting on by hundreds?

3. Fill in the missing numbers.



Does this number line show counting on by tens or counting on by hundreds?

4. Fill in the missing numbers, counting on by tens.

739, 749, _____, 769, _____

5. Explain how you know your numbers show counting on by tens and not counting on by hundreds.

Addressing CA CCSSM 2.NBT.5, 2.NBT.7; building towards 2.NBT.7; practicing MP7 and MP8

Add and Subtract with Tens and Hundreds

Let's add and subtract tens or hundreds.

Warm-up

Number Talk: Add Multiples of 10

Find the value of each expression mentally.

- 34 + 20
- 34 + 60
- 58 + 30
- 158 + 40

Activity 1

Show It with Base-Ten Blocks

Use base-ten blocks. Show each number. Then roll a number cube to see how many tens or hundreds to add or subtract.

1. Show 297.
   a. Add _____ hundreds.
   b. Complete the equation: 297 + _____ = _____

2. Show 432.
   a. Add _____ tens.
   b. 432 + _____ = _____

3. Show 982.
   a. Subtract _____ tens.
   b. 982 − _____ = _____

4. Show 351.
   a. Add _____ hundreds.
   b. Write an equation:

5. Show 805.

   a. Subtract _____ hundreds.
   b. Write an equation:

Activity 2

How Many with Base-Ten Blocks and Equations

1. Mai has 2 hundreds, 2 tens, and 3 ones. Lin has 4 hundreds.

   Represent their values. Use base-ten blocks or diagrams.

   What is the value of their blocks altogether? Show your thinking, using objects, drawings, numbers, or words.

2. Andre has 4 hundreds, 2 tens, and 8 ones.

   Represent his value. Use base-ten blocks or diagrams.

   Andre gives 2 hundreds to Clare.

   What is the value of his blocks now?

3. Diego has 6 tens. Tyler has 8 hundreds, 3 tens, and 6 ones.

   What is the value of their blocks altogether? Show your thinking, using objects, drawings, numbers, or words.

4. Elena has 5 hundreds, 7 tens, and 2 ones. She gives 2 tens to Kiran.

   What is the value of her blocks now? Show your thinking, using objects, drawings, numbers, or words.

5. Priya has 6 hundreds, 5 tens, and 8 ones. Han gives her 3 hundreds.

   What is the value of her blocks now? Show your thinking, using objects, drawings, numbers, or words.

6. Jada has 4 hundreds, 8 tens, and 2 ones. She gives 3 hundreds to Noah.

   What is the value of her blocks now? Show your thinking, using objects, drawings, numbers, or words.

Addressing CA CCSSM 2.NBT.7; practicing MP1

Count On or Count Back to Subtract

Let's find the difference between numbers.

Warm-up

Number Talk: Tens and Hundreds

Find the value of each expression mentally.

- 120 + 20
- 120 + 200
- 124 + 30
- 124 + 300

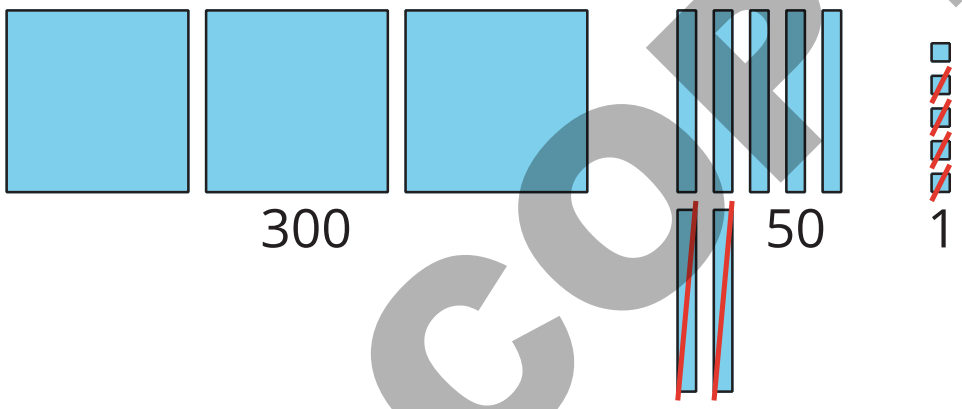
Activity 1

Jump Back, Back, Back

Jada and Andre find the value of 375 – 24.

Jada's work

375 – 24 = 351

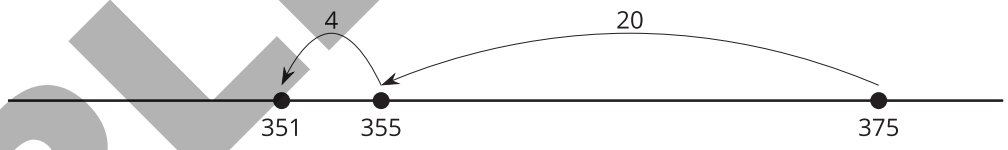


Andre's work

375 – 20 = 355

355 – 4 = 351

375 – 24 = 351



What do you notice? What do you wonder?

1. Try Andre's way. Find the value of 189 – 73. Show your thinking, using drawings, numbers, or words.

   Use a number line if it helps.

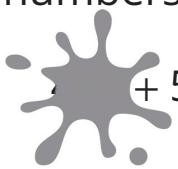
2. Find the value of 647 – 46. Show your thinking, using drawings, numbers, or words.

   Use a number line if it helps.

Activity 2

Who Spilled Paint?

Oh no! Diego spilled paint on his paper. He can't see all the numbers.

 + 540 = 1,000

Find the number that makes each equation true.

1. 250 +  = 1,000
2. 600 – 440 = 
3. 680 +  = 900
4.  + 590 = 1,000
5. 900 – 370 = 

1. _____
2. _____
3. _____
4. _____
5. _____

Unit 7, Lesson 4

Addressing CA CCSSM 2.NBT.7, 2.NBT.8, 2.NBT.9; practicing MP7

Sec A

Add and Subtract 3-Digit Numbers in Different Ways

Let's add and subtract 3-digit numbers.

Warm-up

Number Talk: Count Back by Place

Find the value of each expression mentally.

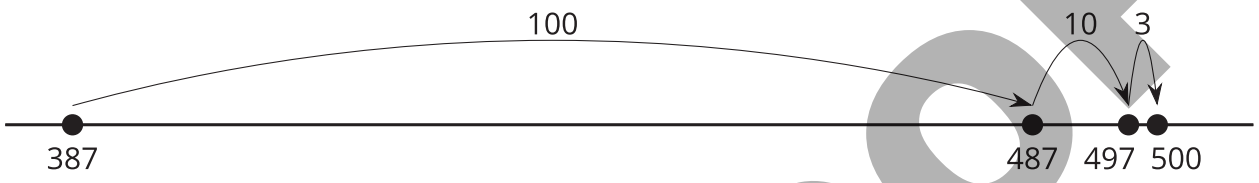
- 586 – 100
- 486 – 20
- 457 – 200
- 257 – 30

Activity 1

Zero Tens and Zero Ones

Mai and Lin find the value of 500 – 387.

Mai's work



387 + ? = 500

387 + 100 = 487

487 + 10 = 497

497 + 3 = 500

100 + 10 + 3 = 113

Lin's work

387 = 300 + 80 + 7

500 – 300 = 200

200 – 80 = 120

120 – 7= 113

Find the value of each expression.

Show your thinking, using drawings, numbers, or words.

1. Try Mai's way. Find the value of 600 – 476.

2. Try Lin's way. Find the value of 400 – 134.

Activity 2

Add or Subtract with Expanded Form

1. Andre and Diego show their thinking with equations. They find the value of 427 + 351.

Andre's work

7 + 1 = 8

20 + 50 = 70

400 + 300 = 700

700 + 70 + 8 = 778

Diego's work

400 + 20 + 7

300 + 50 + 1

700 + 70 + 8 = 778

How are Andre's and Diego's work alike? How are they different?

Show your thinking, using drawings, numbers, or words.

2. Try Andre's way. Find the value of 725 + 243.

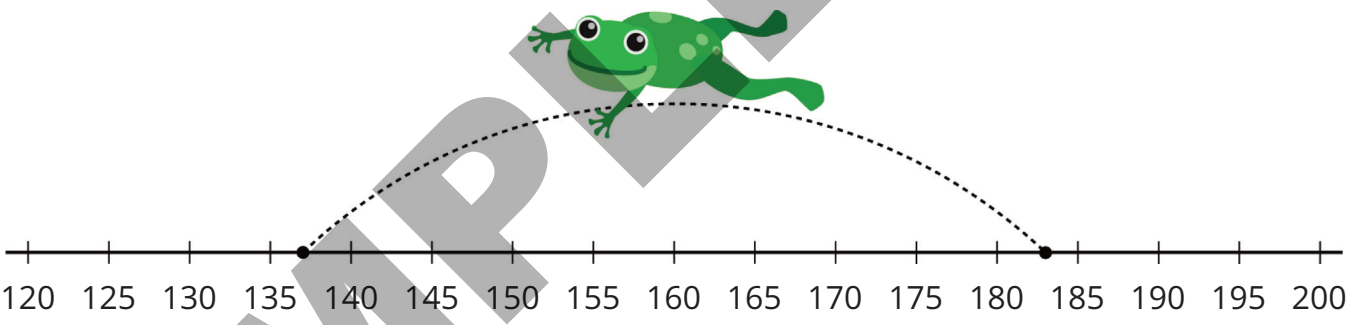
3. Try Diego's way. Find the value of 863 – 432.

4. Choose your own way to find the value of 163 + 326. Show your thinking, using drawings, numbers, or words.

5. Choose your own way to find the value of 692 – 571. Show your thinking, using drawings, numbers, or words.

Section A Summary

We compared 3-digit numbers. We used addition to find the difference. We added and subtracted by counting on or counting back. We wrote numbers in expanded form to add or subtract, using place value.



Addressing CA CCSSM 2.NBT.7; building on 2.NBT.1; building towards 2.NBT.7; practicing MP1 and MP5

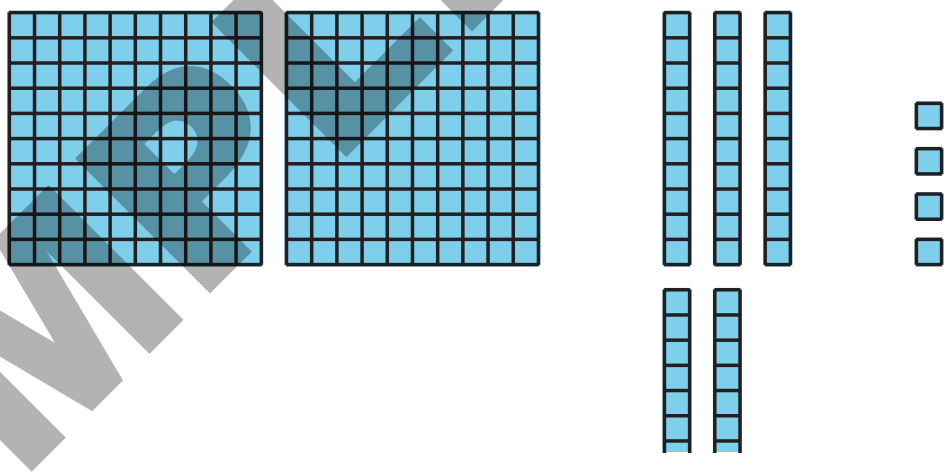
Center Day 1

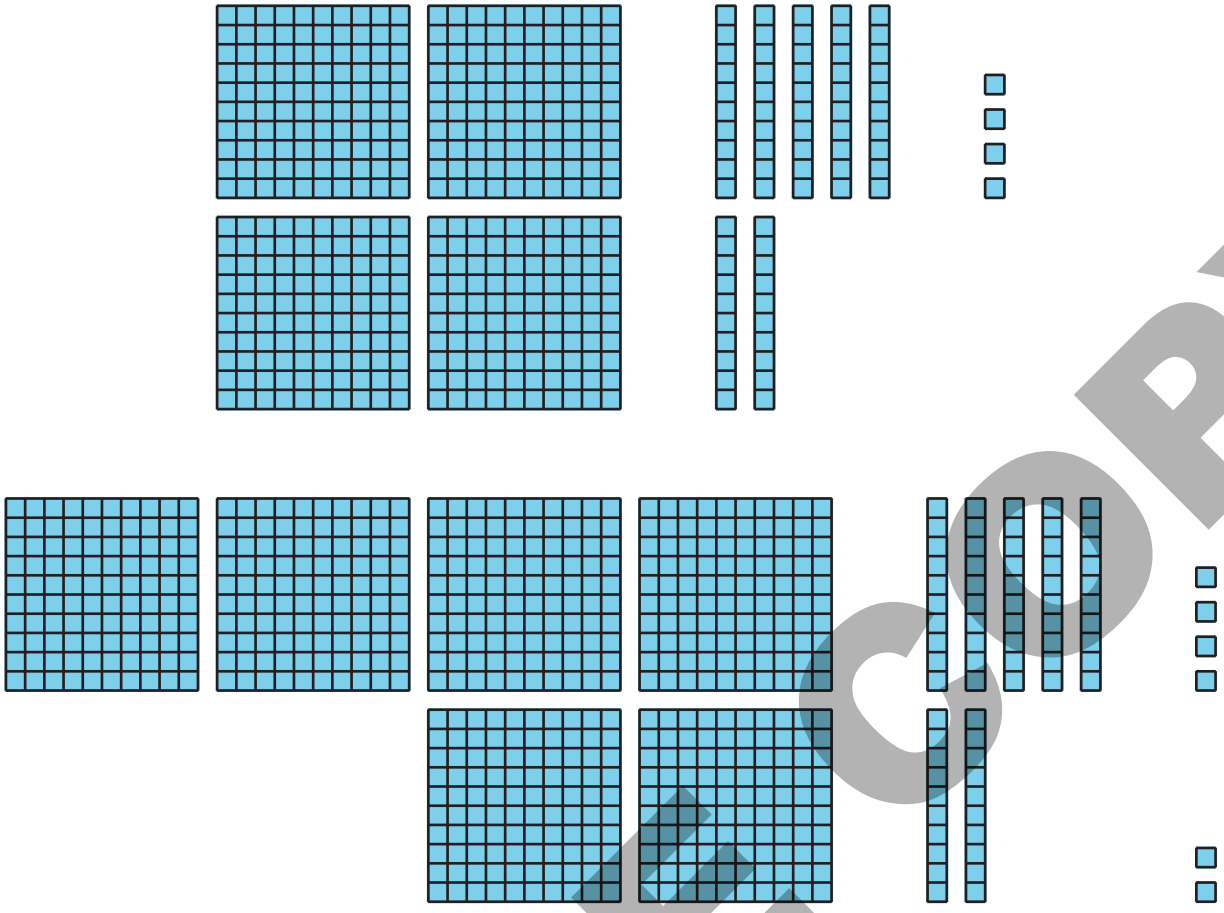
Let's add numbers within 1,000.

Warm-up

How Many Do You See: Hundreds, Tens, and Ones

How many do you see? How do you see them?



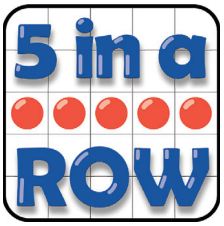


Activity 2

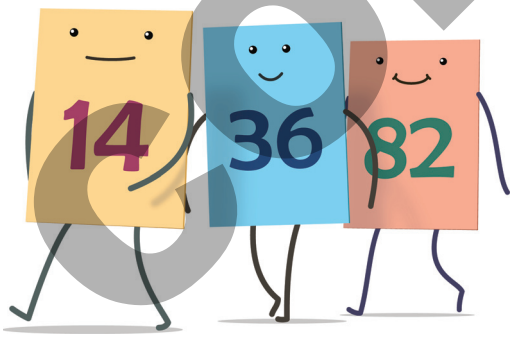
Centers: Choice Time

Choose a center.

Five in a Row: Addition and Subtraction



Get Your Numbers in Order



Mystery Number

The Greatest of Them All

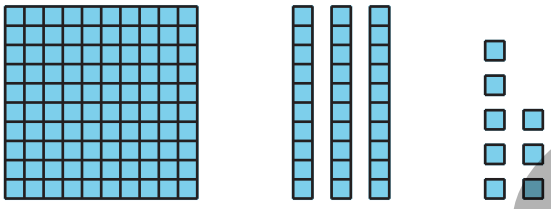
Practice Problems

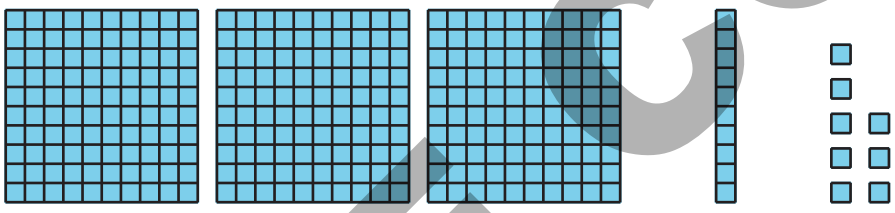
11 Problems

1 Pre-unit

Sec A

Select **all** representations of the number 318.

A. 

B. 

C. $300 + 10 + 8$

D. $100 + 30 + 8$

E. Three hundred eighteen

F. Three hundred eighty-one

2 Pre-unit

Write a number for each representation.

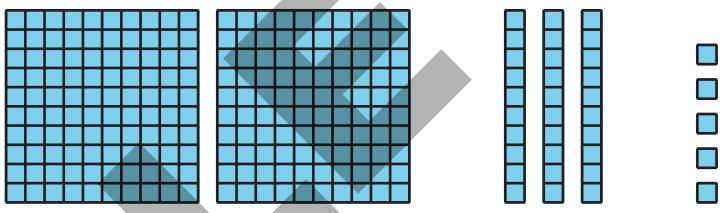
a. Five hundred twenty-seven

_____

b. 300 + 60 + 8

_____

c.



_____

d. 5 + 40 + 700

_____

Find the value of each sum or difference. Show your thinking, using drawings, numbers, or words.

a. 52 – 43

b. 65 – 19

c. 36 + 47

4 Pre-unit

Find the value of each difference.

a. 77 – 10

b. 77 – 20

c. 90 – 70

5 from Unit 7, Lesson 1

Sec A

Find the value of each difference. Show your thinking, using drawings, numbers, or words.

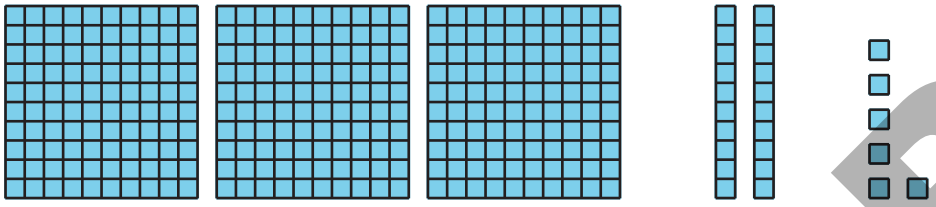
a. 53 – 50

b. 285 – 281

c. 90 – 88

6 from Unit 7, Lesson 2

a. Here are Kiran's blocks.



He gives 2 tens to Priya.

What is the value of Kiran's blocks now? Show your thinking, using objects, drawings, numbers, or words.

b. Then Priya gives Kiran 4 hundreds.

What is the value of Kiran's blocks now? Show your thinking, using objects, drawings, numbers, or words.

7 from Unit 7, Lesson 3

Find the value of each difference. Show your thinking, using objects, drawings, numbers, or words.

a. 648 – 25

b. 535 – 24

8 from Unit 7, Lesson 4

a. Find the value of 600 – 289. Show your thinking, using drawings, numbers, or words.

b. Find the value of 245 + 612. Show your thinking, using drawings, numbers, or words.

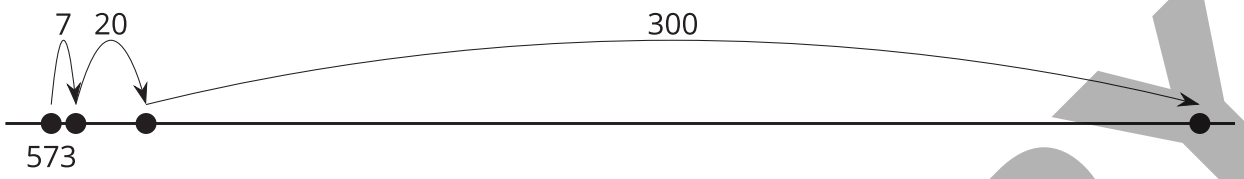
9 from Unit 7, Lesson 5

Find the value of each expression. Explain your reasoning.

a. 365 + 214

b. 365 – 214

10 Han used a number line to find a difference. Here is his work.



a. Write an expression to show the difference Han found. Explain your reasoning.

b. Write an addition equation and a subtraction equation to match Han's work.

Tyler finds the value of 438 – 275. He uses what he knows about differences between 2 two-digit numbers.

"First, I find 43 – 27. Then I find 8 – 5. That gives me the answer."

a. Use Tyler's reasoning. Find the value of 438 – 275.

b. Do you think Tyler's strategy will always work? Why or why not?

Addressing CA CCSSM 2.NBT.5, 2.NBT.7; practicing MP1 and MP6

Use a Ten to Add within 1,000

Let's add 3-digit numbers by composing a ten.

Warm-up

Number Talk: Numbers That Make 10

Find the value of each expression mentally.

- 28 + 2
- 28 + 12
- 67 + 3
- 67 + 23

Activity 1

Add 2-Digit and 3-Digit Numbers

1. Find the value of each sum.

Set 1	Set 2	Set 3
245 + 15	134 + 26	351 + 19
247 + 23	133 + 37	356 + 24
249 + 31	138 + 42	355 + 35

2. What patterns do you notice?

Activity 2

Card Sort: Perfect Ten

Your teacher will give you a set of cards.

1. Match each 3-digit number to a 2-digit number. When you add your numbers together, they should make a ten, with no extra ones. Be ready to explain your reasoning.

2. Pick 1 pair of numbers. Find the value of their sum. Show your thinking, using drawings, numbers, or words.

Addressing CA CCSSM 2.NBT.7, 2.NBT.8; building on 2.NBT.1; building towards 2.NBT.7; practicing MP3 and MP7

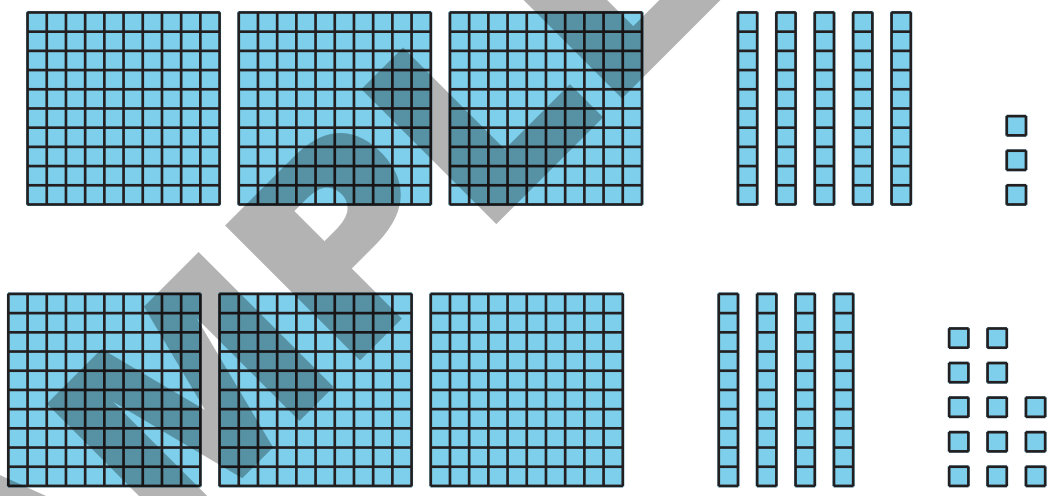
Compose a Greater Unit

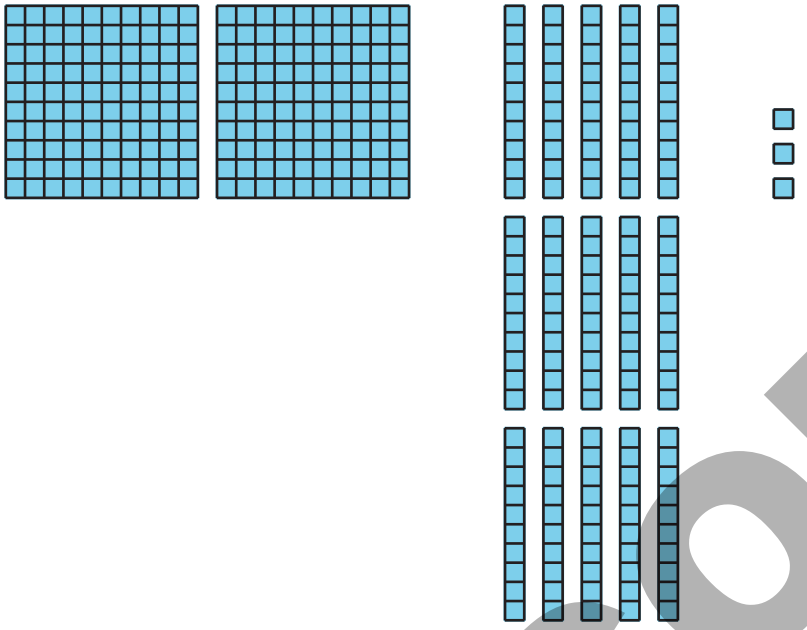
Let's add 3-digit numbers and compose tens or hundreds.

Warm-up

How Many Do You See: Are They the Same?

How many do you see? How do you see them?





Activity 1

Compose a Ten or a Hundred

1. Find the value of each expression. Show your thinking, using objects, drawings, numbers, or words.

   a. $364 + 28$

   b. $364 + 82$

2. Compare your thinking with your partner.

Activity 2

Walk about and Add

Work with a partner.

1. a. Record your numbers to make an expression.

   _____ + _____

   b. Do you need to compose a ten?

   Yes or No

   c. Do you need to compose a hundred?

   Yes or No

   d. Find the value of the sum. Show your thinking, using drawings, numbers, or words.

2. a. Record your numbers to make an expression.

_____ + _____

b. Do you need to compose a ten?

Yes or No

c. Do you need to compose a hundred?

Yes or No

d. Find the value of the sum. Show your thinking, using drawings, numbers, or words.

3. a. Record your numbers to make an expression.

_____ + _____

b. Do you need to compose a ten?

Yes or No

c. Do you need to compose a hundred?

Yes or No

d. Find the value of the sum. Show your thinking, using drawings, numbers, or words.

Addressing CA CCSSM 2.NBT.7, 2.NBT.9; building on 2.NBT.1; building towards 2.NBT.7; practicing MP3

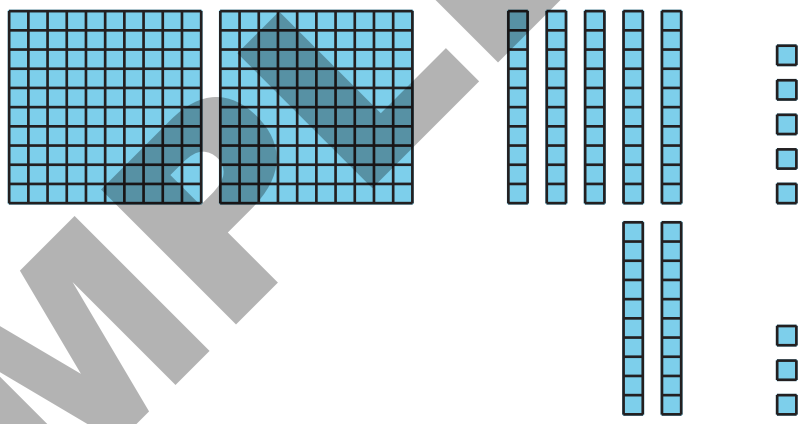
Compose Tens and Hundreds to Add

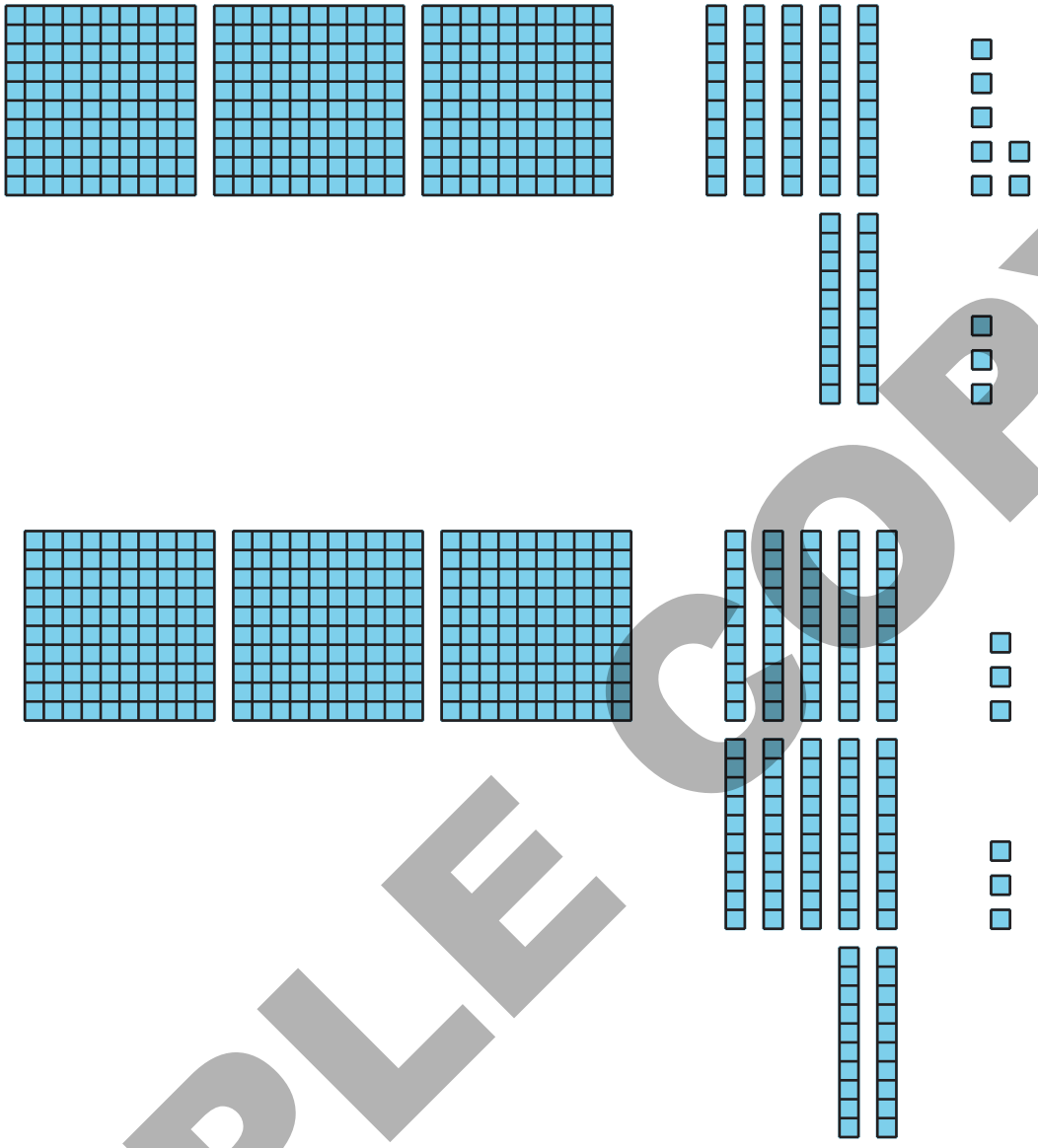
Let's compose tens and hundreds to add.

Warm-up

How Many Do You See: Too Many Tens

How many do you see? How do you see them?





Activity 1

Compare the Sums

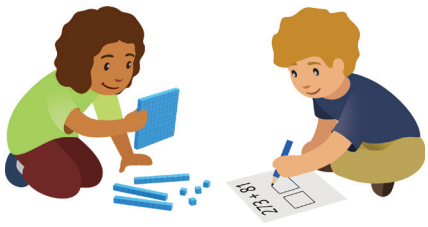
Find the value of each sum. Show your thinking, using objects, drawings, numbers, or words.

1. 273 + 18

2. 273 + 81

3. $273 + 88$

4. How are the sums alike? How are they different?



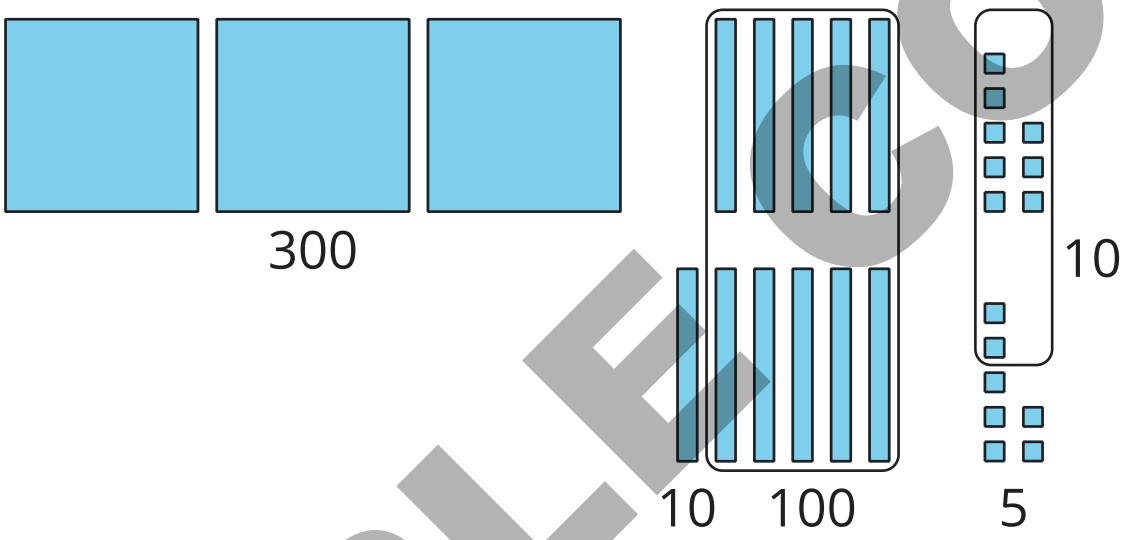
Activity 2

Different Ways to Show Your Thinking

1. Priya and Lin find the value of 358 + 67.

Sec B

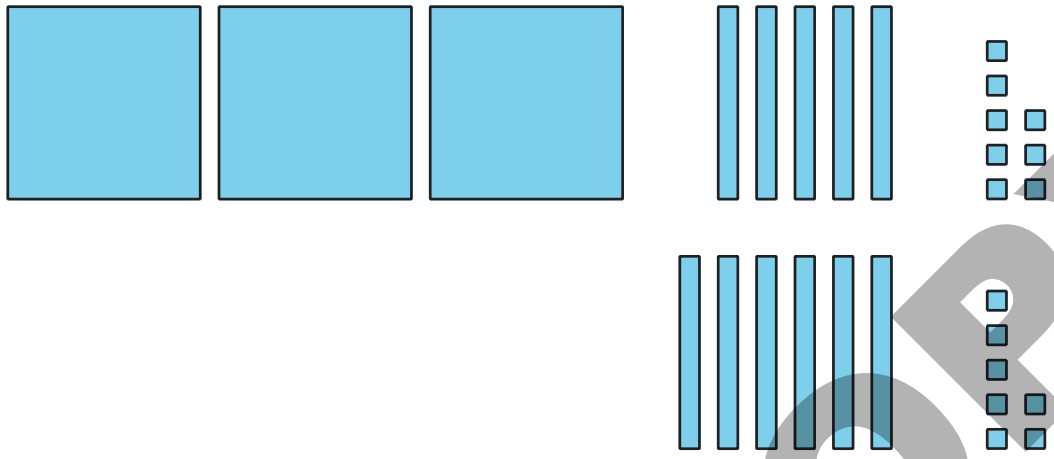
Priya's work



300 + 100 + 10 + 10 + 5

400 + 20 + 5 = 425

Lin's work



3 hundreds + 11 tens + 15 ones

11 tens = 110

15 ones = 15

300 + 110 + 15 = 425

How are Priya's and Lin's work alike? How are they different? Explain your reasoning.

2. Find the value of 546 + 86.

   Show your thinking, using objects, drawings, numbers, or words.

Addressing CA CCSSM 2.NBT.7, 2.NBT9; practicing MP3

Add 3-Digit Numbers

Let's practice adding within 1,000.

Warm-up

Number Talk: Ten and Some More

Find the value of each expression mentally.

- 528 + 2
- 528 + 7
- 487 + 3
- 487 + 8

Activity 1

How Did You Add 3-Digit Numbers?

Find the value of each expression. Show your thinking, using drawings, numbers, or words.

1. 384 + 409

2. 757 + 152

3. $227 + 673$

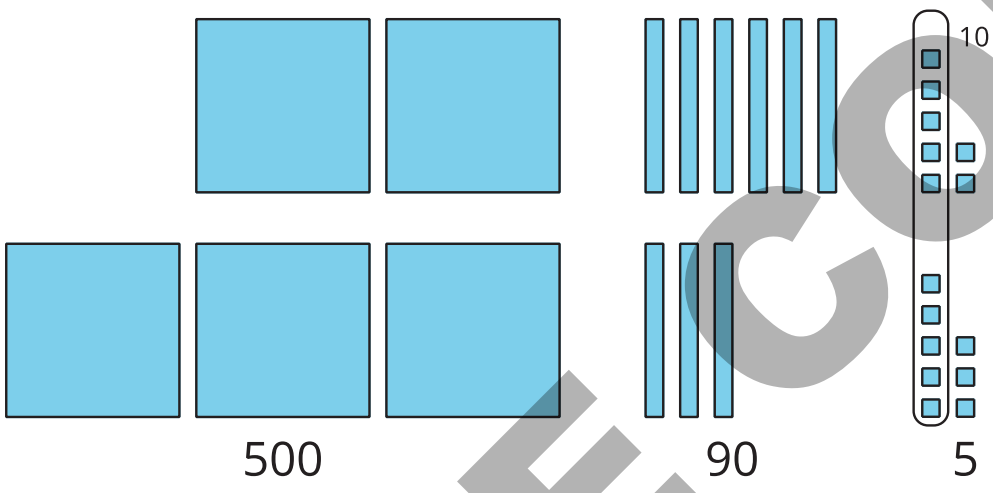
4. $575 + 166$

Activity 2

Analyze and Add

Noah and Kiran find the value of 267 + 338.

Noah's work



500 + 90 + 5 = 595

Kiran's work

200 + 300 = 500
60 + 30 = 90
7 + 8 = 15
500 + 90 + 15
500 + 90 + 10 + 5
500 + 100 + 5 = 605

1. How are Noah's and Kiran's work alike? How are they different?

2. Who found the correct value? Explain your reasoning.

Addressing CA CCSSM 2.NBT.7, 2.NBT.9; building on 2.NBT.2; practicing MP3

Add within 1,000

Let's find sums within 1,000 and explain our strategies.

Warm-up

Number Talk: Use Sums to Find Sums

Find the value of each expression mentally.

- 199 + 23
- 198 + 24
- 297 + 25
- 395 + 27

Activity 1

Sort 3-digit Sums

1. Sort the cards into 2 groups with your partner.
    - Make a group of expressions that you agree is less challenging to find.
    - Make another group of expressions that you agree is more challenging to find.
    - Keep any expressions together that you and your partner disagree on.
2. Choose an expression that you feel is less challenging. Find the value of the sum. Show your thinking, using drawings, numbers, or words.

3. Choose an expression that you feel is more challenging. Find the value of the sum. Show your thinking, using drawings, numbers, or words.

4. Discuss 1 card you and your partner disagree on. Do you feel the expression is more challenging or less challenging? Explain your reasoning.

Activity 2

Find the Unknown Value

Oh no! Diego spilled paint on his paper. He can't see all the digits in each of his equations.

900 + ▢00 = 1,000

1. Find the 3-digit number that makes the equation true. Show your thinking, using drawings, numbers, or words.

5▢0 + 430 = 1,000

2. Find the 3-digit number that makes the equation true. Show your thinking, using drawings, numbers, or words.

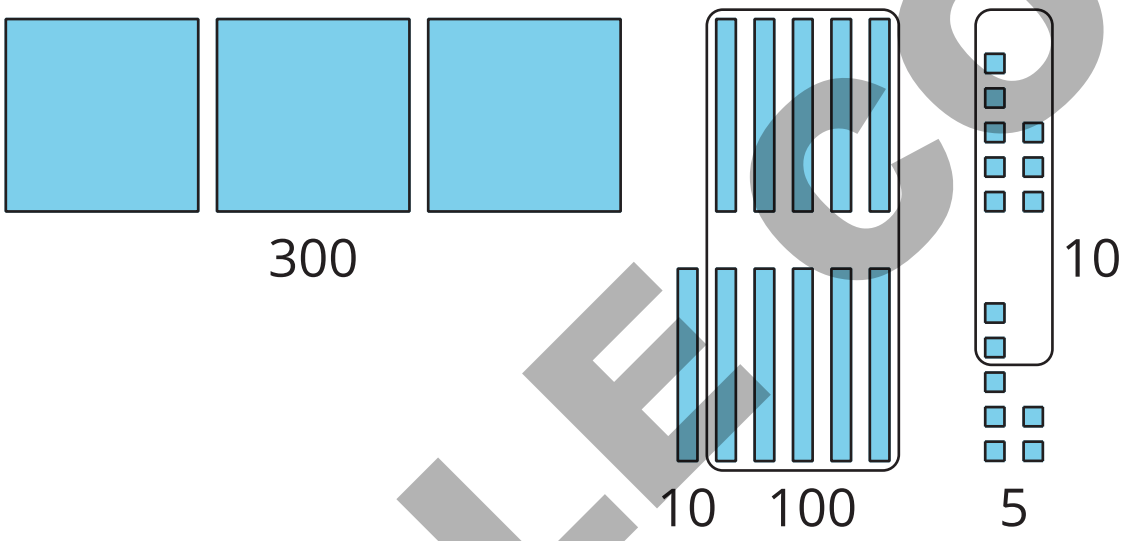
▢35 + 615 = 1,000

Section B Summary

We used place value to add 3-digit numbers. We added hundreds to hundreds, tens to tens, and ones to ones, with base-ten blocks, diagrams, and equations. We learned that we may need to compose a ten, a hundred, or both when adding by place value.

Base-Ten Diagram

$358 + 67$



Unit Form and Equations

$358 + 67$

Adding by Place

$267 + 338$

3 hundreds + 5 tens + 8 ones

6 tens + 7 ones

3 hundreds + 11 tens + 15 ones

11 tens = 110

15 ones = 15

300 + 110 + 15 = 425

200 + 300 = 500

60 + 30 = 90

7 + 8 = 15

500 + 90 + 15

500 + 90 + 10 + 5

500 + 100 + 5 = 605

Addressing CA CCSSM 2.NBT.6, 2.NBT.7; practicing MP1 and MP2

Center Day 2

Let's add numbers within 1,000.

Warm-up

Number Talk: Make 100

Find the value of each expression mentally.

- 80¢ + 20¢ + 37¢
- 80¢ + 20¢ + 37¢ + 42¢
- 75¢ + 37¢ + 25¢
- 75¢ + 80¢ + 25¢ + 20¢

Activity 2

Introduce Five in a Row—Add within 1,000, with Composing

Choose a center.

Five a Row: Addition and Subtraction

How Close?

Practice Problems

7 Problems

1 from Unit 7, Lesson 6

Find the value of each sum. Show your thinking, using drawings, numbers, or words.

a. $238 + 52$

b. $252 + 38$

c. $119 + 61$

2 from Unit 7, Lesson 7

Find the value of each sum. Show your thinking, using drawings, numbers, or words.

a. $495 + 62$

b. $417 + 532$

3 from Unit 7, Lesson 8

Find the value of each sum. Show your thinking, using drawings, numbers, or words.

a. $189 + 32$

b. $345 + 77$

4 from Unit 7, Lesson 9

Here is how Jada found the value of 741 + 179.
741 + 9 = 750
750 + 100 = 850

a. Explain Jada's error.

b. Correct Jada's work. Find the value of 741 + 179.

5 from Unit 7, Lesson 10

a. Find the value of 382 + 479.

b. Find the unknown digit that makes the equation true. Explain how you know.

534 + 4___6 = 1,000

6 Exploration

Here is how Han likes to add.

$$\begin{array}{rrrr} & 4 & 4 & 8 \\ + & 3 & 9 & 6 \\ \hline + & 7 & 13 & 14 \\ \hline & 8 & 4 & 4 \end{array}$$

a. Why does his method work? Explain your reasoning.

b. What do you think of his method?

c. Use his method. Find the value of 388 + 259.

7 Exploration

Here is an equation with several unknown digits.

___ ___ 5 + 63 ___ = 823

a. Find the unknown digits that make the equation true.

b. Can you complete the numbers in more than 1 way to make the equation true? Explain your reasoning.

Unit 7, Lesson 12

Addressing CA CCSSM 2.NBT.7; building on 2.NBT.1, 2.NBT.3; practicing MP1

Decompose to Subtract

Let's subtract within 1,000.

Warm-up

What Do You Know about 354?

What do you know about 354?

How can you represent the number 354?

Activity 1

Subtract from 354

Find the value of each expression in any way that makes sense to you. Explain your reasoning.

1. 354 – 7

2. 354 – 36

3. 354 – 48

Activity 2

Decompose with Base-Ten Blocks

Work with your partner. Find the value of each expression.

- Partner A: Read the expression. Represent the greater number, using blocks.
- Partner B: Decide if you need to decompose a ten. Then subtract.
- Discuss. Then write the difference.
- Switch roles.

1. 264 – 38

2. 274 – 41

3. 336 – 115

4. 343 – 127

5. 485 – 266

6. 451 – 315

Addressing CA CCSSM 2.NBT.7 2.NBT.9; building on 2.NBT.1; building towards 2.NBT.7; practicing MP2

Decompose Tens or Hundreds

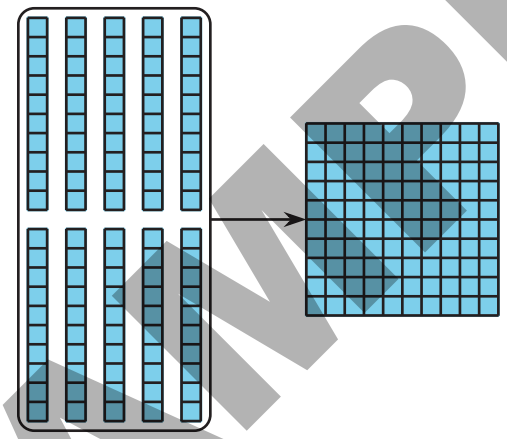
Let's decompose a ten or a hundred to subtract.

Warm-up

Which Three Go Together: Blocks and Blocks

Which 3 go together?

A



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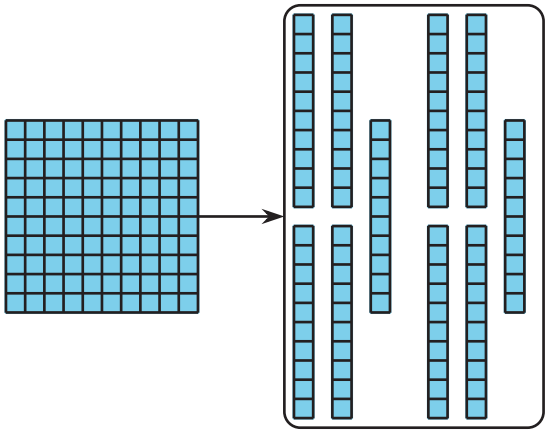

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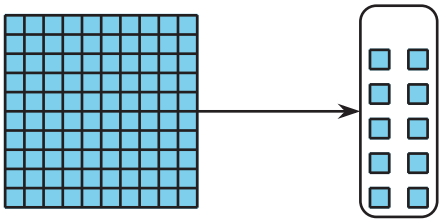

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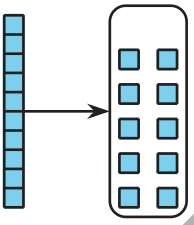


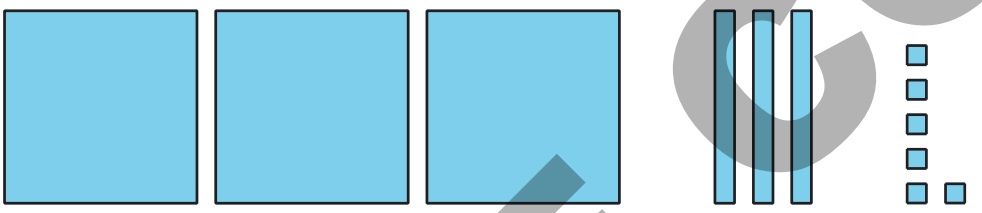
Activity 1

Subtract with Base-Ten Diagrams

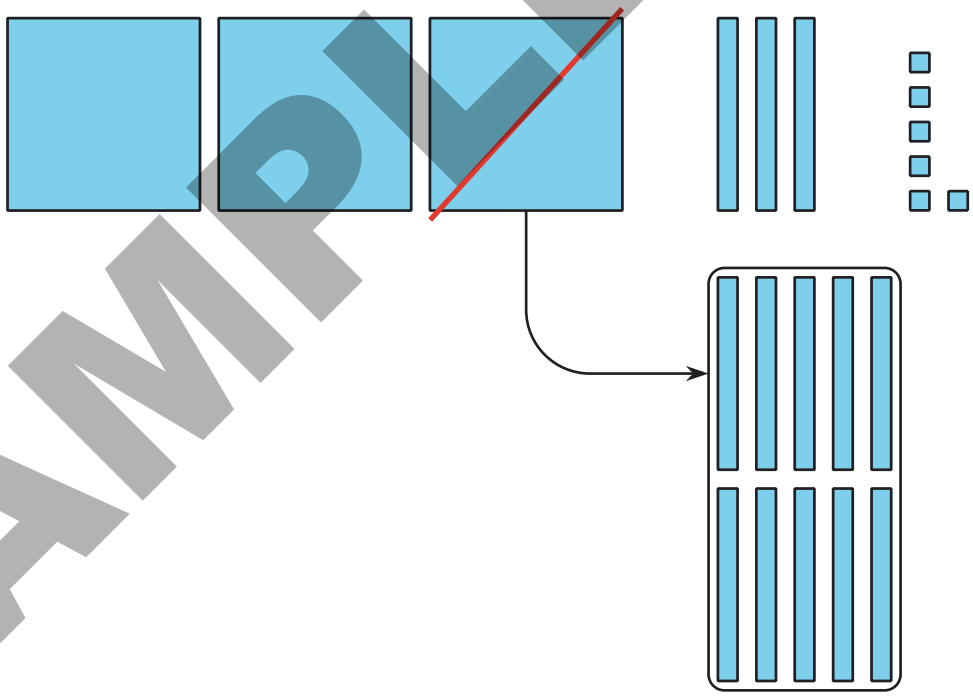
Mai used base-ten blocks to find the value of 336 – 52. Then she made a matching diagram.

What did she do in Step 2? What should she do to find the difference? Explain your reasoning.

Step 1



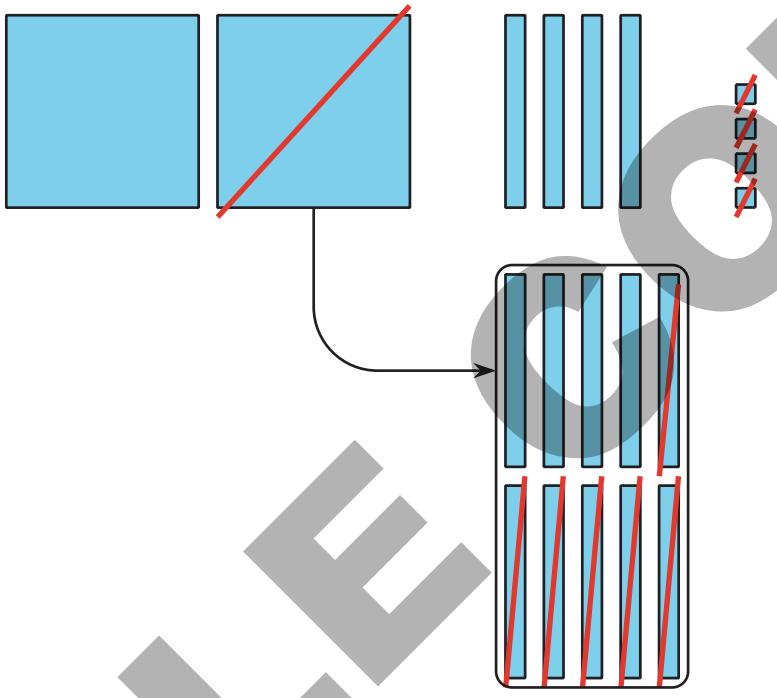
Step 2



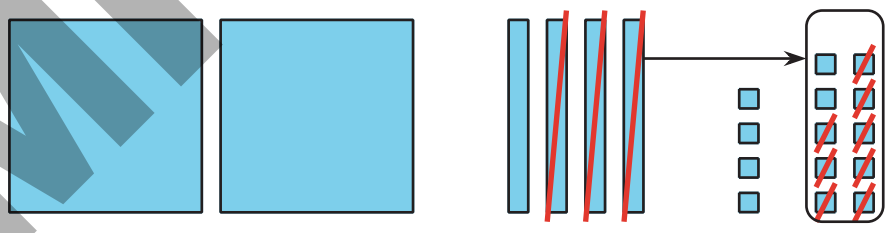
1. Write each expression next to the matching diagram. Then find the value of each difference.

244 – 28 256 – 64 244 – 64

a.



b.



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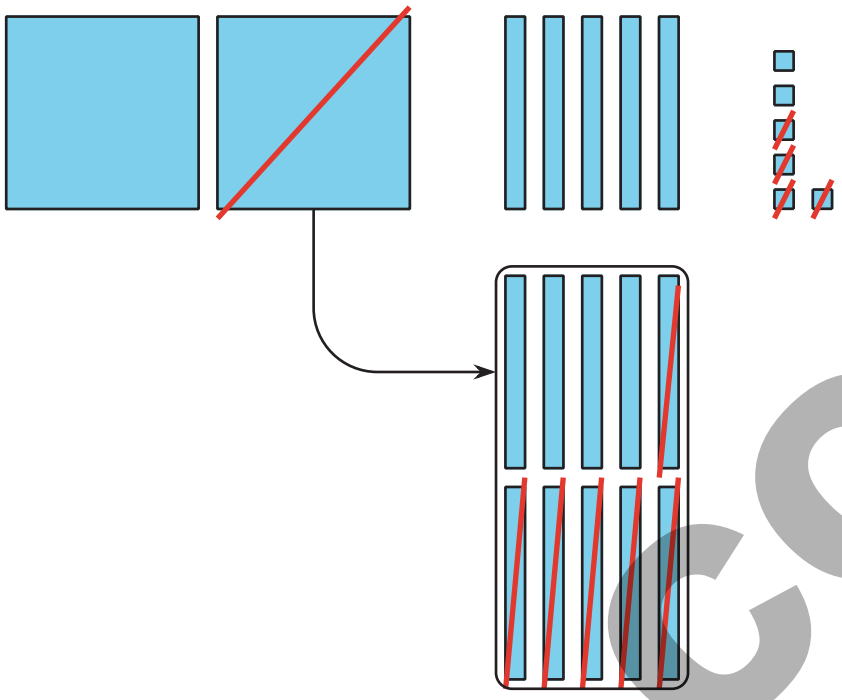


Activity 2

Decompose a Ten or a Hundred

Find the value of each difference. Show your thinking, using drawings, numbers, or words. Try Mai's way for 1 expression.

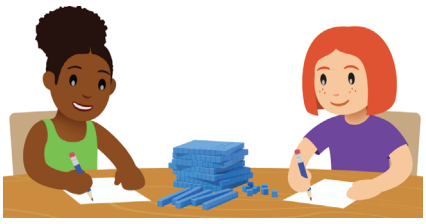
1. 155 – 26

2. 352 – 71

3. 364 – 182

4. 293 – 147

5. Share how you found the value of 1 expression with your partner. Use the sentence frames to explain your reasoning.
    - “First I . . . .”
    - “Next I . . . .”
    - “Then I . . . .”
    - “Last I . . . .”



Unit 7, Lesson 14

Addressing CA CCSSM 2.NBT.1, 2.NBT.7, 2.NBT.9; practicing MP7

Think Before You Subtract

Let's think about decomposing before subtracting.

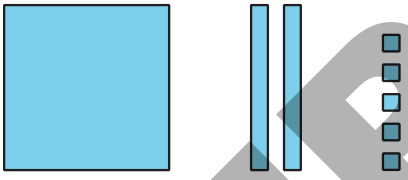
Warm-up

Sec C

Which Three Go Together: Blocks and Blocks and Blocks

Which 3 go together?

A



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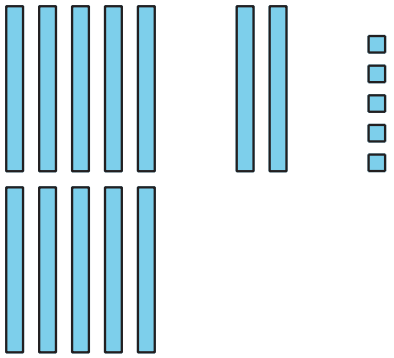
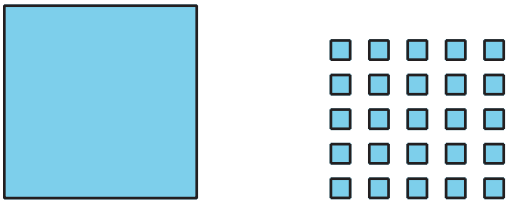


C



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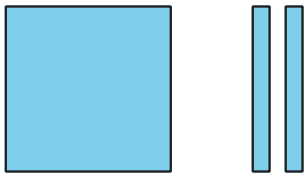


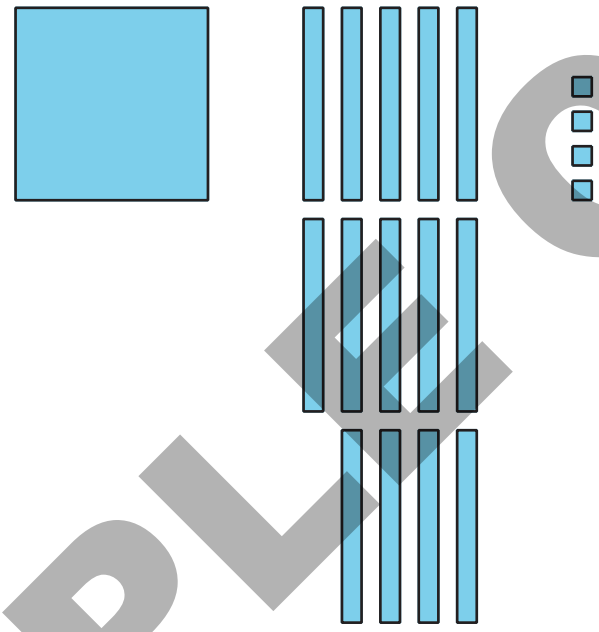
Activity 1

Agree to Disagree

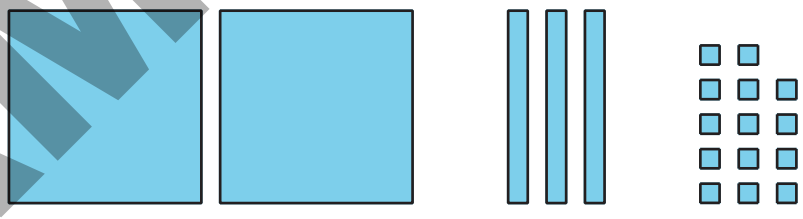
Tyler and Clare subtract by place to find the value of 244 – 67. Tyler says he will decompose before he starts. Clare agrees.

The diagrams show each student's first steps.

Tyler



Clare



1. How are Tyler's and Clare's diagrams alike? How are they different?

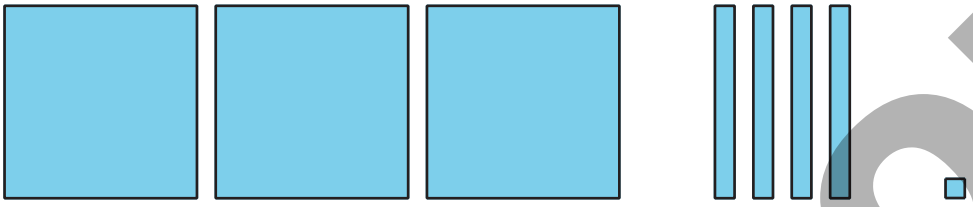
2. Complete their diagrams to find the value of 244 – 67.

3. What do Tyler's and Clare's diagrams look like after the last step? How are these diagrams alike? How are they different?

Activity 2

Sort and Subtract

Here is a base-ten diagram for 341.



Andre wants to use diagrams and subtract by place to find the value of 341 – 68. He says he will decompose a ten and a hundred to subtract. Why do you think he said that?

1. Andre only wants to use a diagram to subtract by place if he decomposes a unit. Help him sort the expressions into groups. You can use base-ten blocks or a diagram to help.

599 – 66	449 – 88	346 – 78
633 – 55	237 – 29	321 – 34
457 – 45	735 – 72	645 – 87
905 – 42	693 – 63	866 – 58
514 – 26	387 – 44	277 – 65

decompose 2 units	decompose 1 unit	do not decompose

2. Find the value of 1 expression from each group. Show your thinking, using drawings, numbers, or words.

Unit 7, Lesson 15

Addressing CA CCSSM 2.NBT.2, 2.NBT.7, 2.NBT.9; practicing MP2

Decompose a Ten and a Hundred to Subtract

Let's subtract within 1,000.

Activity 1

Elena's Thinking

Elena's thinking

Step 1

	7 hundreds	2 tens	6 ones
–	5 hundreds	5 tens	8 ones

Step 2

		1	16
	7 hundreds	~~2~~ tens	~~6~~ ones
–	5 hundreds	5 tens	8 ones

Step 3

		11	
	6	~~1~~	16
	~~7~~ hundreds	~~2~~ tens	~~6~~ ones
–	5 hundreds	5 tens	8 ones

1. Use a base-ten diagram or blocks to show Elena's steps.

2. Finish her work. Find the value of 726 – 558.

3. What is another way to use numbers or equations to show subtracting by place to find the value of 726 – 558?

Activity 2

Walk about and Subtract

- Find someone with a different number than you.
- Find the difference between your numbers.
- Show your thinking, using drawings, numbers, or words.
- Trade cards. Find a new partner.

1. Partner 1:

2. Partner 2:

3. Partner 3:

Addressing CA CCSSM 2.NBT.1, 2.NBT.4, 2.NBT.4, 2.NBT.7, 2.NBT.9; practicing MP3

Subtract within 1,000

Let's subtract in a way that makes sense.

Warm-up

True or False: Equations Based on Place Value

Decide if each statement is true or false. Be prepared to explain your reasoning.

- 2 hundreds + 3 tens + 4 ones = 2 hundreds + 3 tens + 14 ones

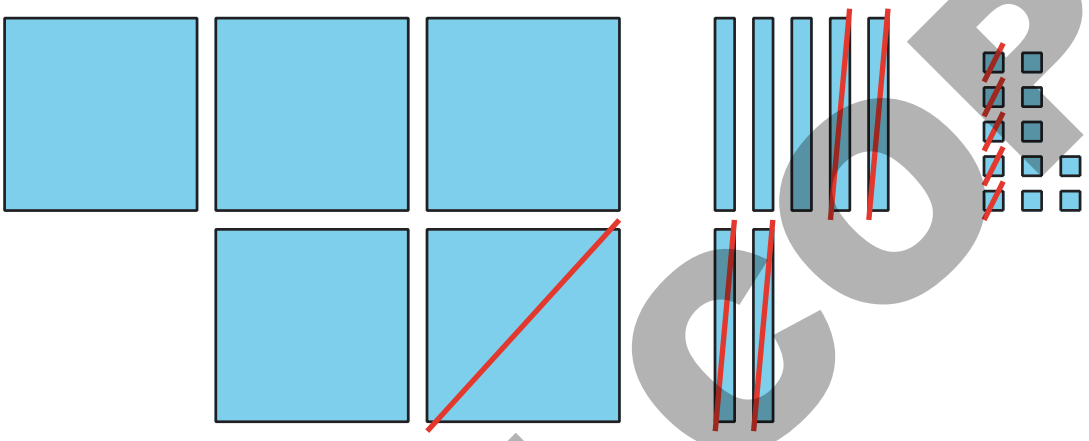
- 2 hundreds + 3 tens + 4 ones = 1 hundred + 13 tens + 4 ones

- 1 hundred + 13 tens + 4 ones = 1 hundred + 12 tens + 14 ones

Activity 1

Jada's Thinking

Lin's diagram



Jada's equations

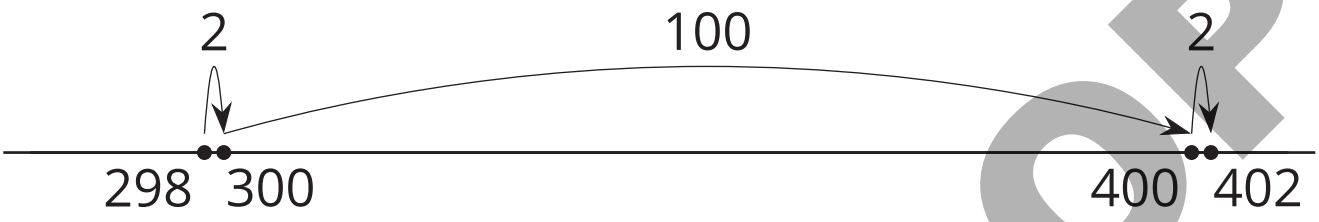
500 − 100 =

70
~~8~~0 − 40 =

12
~~2~~ − 5 =

1. a. Discuss how Jada's equations match Lin's diagram.
   b. Finish Jada's work. Find the value of 582 – 145.
2. Jada is thinking about how to find the value of 402 – 298.

   a. Jada knows a way to count on to find the difference. She shows her thinking, using a number line.



   Explain Jada's thinking.

b. Jada says she can't decompose to find the value of 402 – 298, because there aren't any tens. Do you agree? Show your thinking, using objects, drawings, numbers, or words.

Activity 2

Find It Your Way

Find the value of each expression in a way that makes sense to you. Show your thinking, using drawings, numbers, or words.

1. 535 – 214

2. 700 – 589

3. 683 – 398

4. 918 – 608

5. 735 – 457

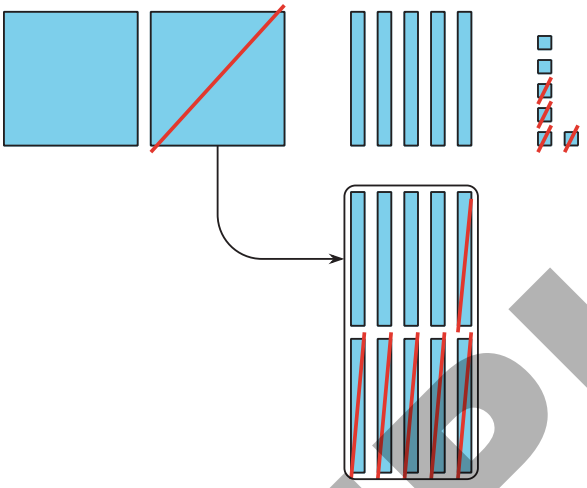
6. 602 – 487

Section C Summary

We learned ways to subtract 3-digit numbers, using place value. We used base-ten blocks, diagrams, and equations to subtract hundreds from hundreds, tens from tens, and ones from ones. We decomposed a hundred, a ten, or both to subtract by place. We looked closely at numbers in expressions. We planned how to decompose. We used friendly numbers or the relationship between addition and subtraction.

Base-Ten Diagram

256 – 64



Unit Form

726 – 558

	7 hundreds	2 tens	6 ones
−	5 hundreds	5 tens	8 ones
	1 hundreds	6 tens	8 ones

168

Addressing CA CCSSM 2.NBT.7, 2.NBT.7.1; building on 2.NBT.7, 2.OA.1; practicing MP3

Does It Make Sense?

Let's decide if our answers make sense.

Warm-up

Estimation Exploration: About How Much?

At Mai's school, there are 358 students in second grade and 465 students in third grade.

About how many students are in the second and third grades altogether?

Record an estimate that is:

too low	about right	too high

Activity 1

Revise the Estimates

There are 227 students in kindergarten and 378 students in first grade at Mai's school.

Her classmates made some estimates about the total number of students in kindergarten and first grade.

Work with your partner. Decide which estimates make sense. Give 1 way each person could improve their estimate.

1. Jada: 500 students, because 2 hundreds and 3 hundreds is 5 hundreds.

    a. Does it make sense? Explain your reasoning to your partner.

b. If not, how could Jada improve her estimate?

2. Lin: 100 students, because 3 hundreds take away 2 hundreds is 1 hundred.

   a. Does it make sense? Explain your reasoning to your partner.

   b. If not, how could Lin improve her estimate?

3. Andre: 600 students, because 227 is close to 225 and 378 is close to 375. 200 + 300 = 500, 25 + 75 = 100, and 500 +100 = 600.

   a. Does it make sense? Explain your reasoning to your partner.

   b. If not, how could Andre improve his estimate?

Activity 2

That's about Right

1. For each expression, decide whether the actual value is greater than or less than the estimate.

   a. Is the value of 451 + 204 greater than or less than 600?

   b. Is the value of 604 – 293 greater than or less than 400?

2. Work with your partner to find the actual value.

3. Find the value of 1 of the expressions. Explain or show your reasoning.

   a. $324 + 478$

   b. $702 - 244$

4. Trade work with a partner. Decide whether your partner's value for the expression makes sense. Explain your reasoning.

Addressing CA CCSSM 2.NBT.7, 2.NBT.8; practicing MP1

Center Day 3

Let's add and subtract 3-digit numbers.

Warm-up

Number Talk: Simplify It

Find the value of each expression mentally.

- 34 – 9
- 434 – 99
- 367 – 98
- 635 – 298

Activity 2

More Target Numbers and Choice Time

Choose a center.

Target Numbers

Five in a Row: Addition and Subtraction

How Close?

☐☐ + ☐☐ = _____

Addressing CA CCSSM 2.NBT.7; building towards 2.NBT.7; practicing MP4

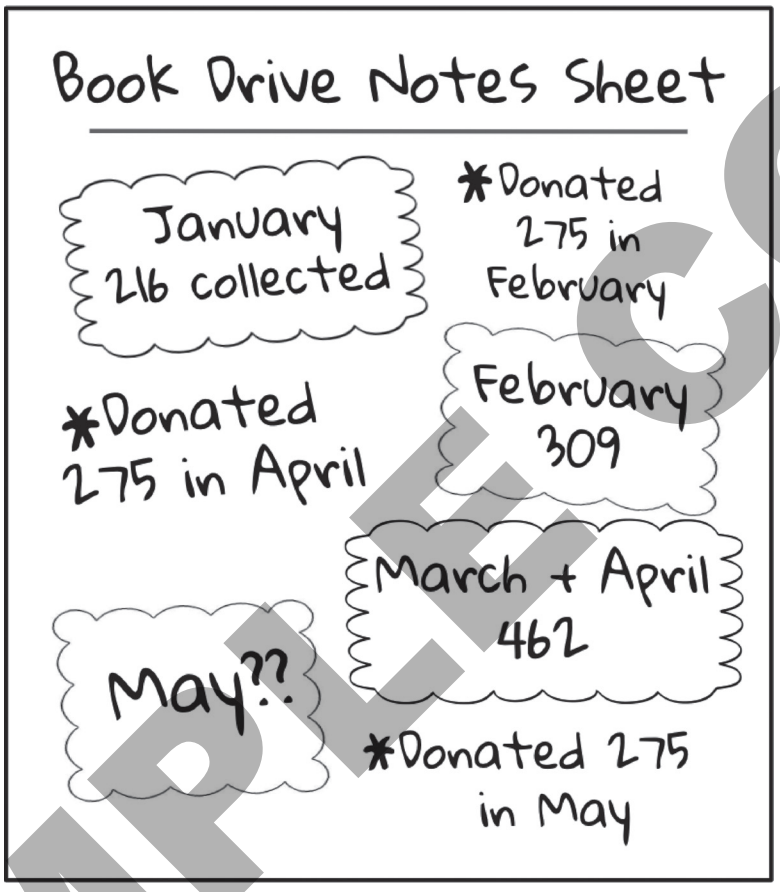
Book Drive

Let's organize information about a book drive.

Warm-up

Notice and Wonder: Book Drive Notes

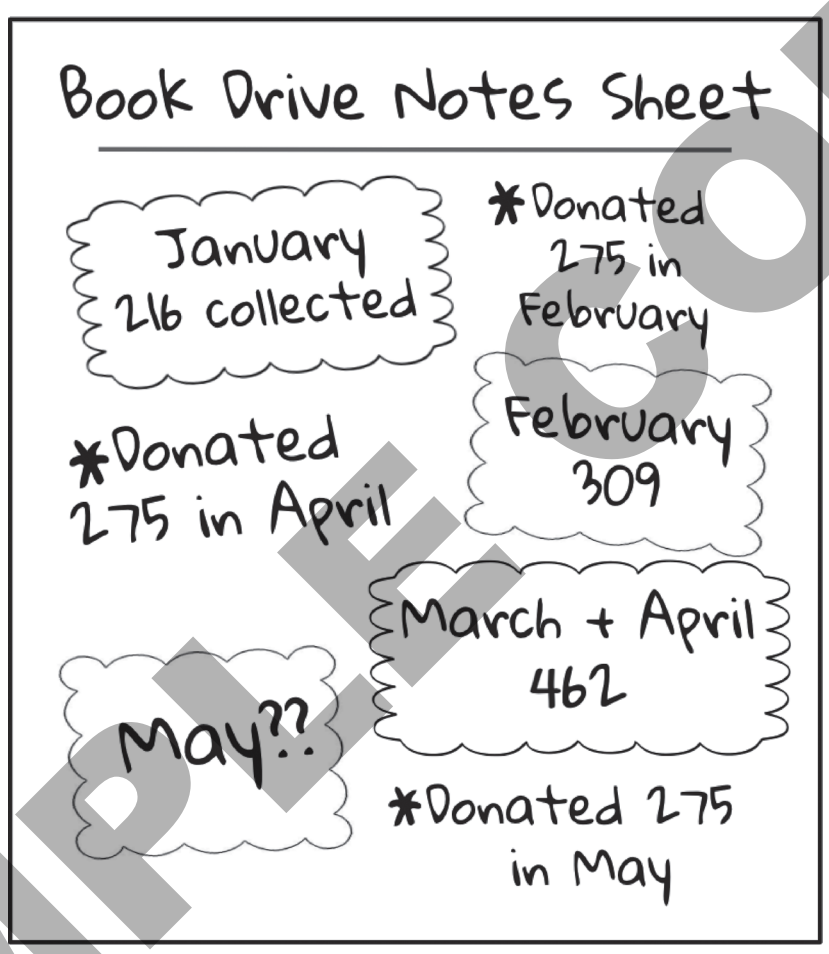
What do you notice? What do you wonder?



Activity 1

Organizing the Notes

Organize the information for the book drive.



Activity 2

Questions about the Book Drive

Solve the problems. Show your thinking, using drawings, numbers, or words.

1. The school donated books to 3 different places. The school donated 275 books to each place. How many books did the school donate in all?

2. What information do you need to find the number of books the school has left over at the end of the book drive?

3. Choose a number of books that you think is reasonable for the school to have collected in May. How many books would the school have left when the book drive is done? Explain your reasoning.

4. What could the school do with the leftover books?

Practice Problems

7 Problems

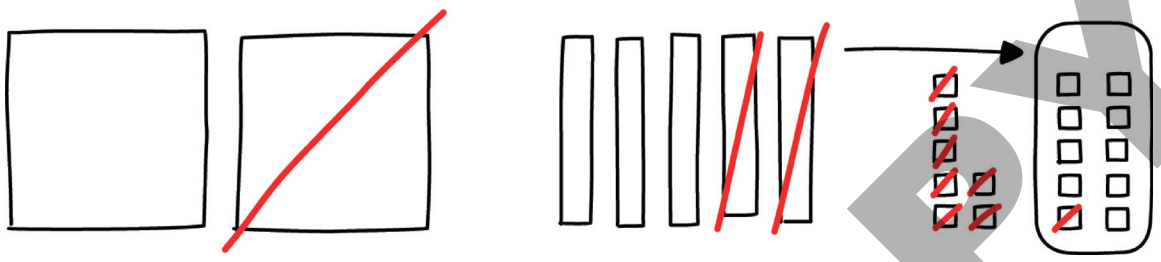
1 from Unit 7, Lesson 12

a. Find the value of each difference.

325 – 19

437 – 115

b. Jada has drawn this picture to find the value of a difference. What difference did Jada calculate? Explain how you know.



2 from Unit 7, Lesson 13

Find the value of each difference. Show your thinking, using drawings, numbers, or words.

a. 936 – 428

b. 352 – 181

3 from Unit 7, Lesson 14

Jada finds the value of 571 – 385. She says she can take ones from ones, tens from tens, and hundreds from hundreds, without decomposing. Do you agree? Explain your reasoning.

4 from Unit 7, Lesson 15

Find the value of each difference. Show your thinking, using drawings, numbers, or words.

a. 216 – 88

b. 803 – 564

5 from Unit 7, Lesson 16

Find the value of each difference in a way that makes sense to you. Show your thinking, using drawings, numbers, or words.

a. 747 – 295

b. 811 – 255

c. 600 – 378

6 Exploration

Here is how Kiran finds the value of 543 – 276.

500 – 200 = 300
300 – 30 = 270
270 – 3 = 267

a. Why does Kiran's method work? Explain your reasoning.

b. Use his method to find 325 – 276.

7 Exploration

a. Choose a 3-digit number to show subtracting by place value is a good strategy for finding the value of 637 – ☐☐☐. Explain your reasoning. Find the value of the difference.

b. Choose a 3-digit number to show adding on to the lesser number is a good strategy for finding the value of 637 – ☐☐☐. Explain your reasoning. Find the value of the difference.

c. Choose a 3-digit number to show decomposing 2 different units is a good strategy for finding the value of 637 – ☐☐☐. Explain your reasoning. Find the value of the difference.

GRADE 2

UNIT

Equal Groups

Content Connections

In this unit you will work with equal groups to learn about multiplication. You will make connections by:

- **Taking Wholes Apart, Putting Parts Together** while using skip counting and equal groups to analyze even and odd numbers.
- **Discovering Shape and Space** while describing arrays using terms such as “rows” and “columns” and building rectangular arrays using inch tiles.

- **Reasoning with Data** while interpreting data in different representations such as number lines, graphs and drawings.
- **Exploring Changing Quantities** while using rectangular arrays as the total number of objects as a sum of the objects in each row and as a sum of the objects in each column.

Addressing the Standards

As you work your way through **Unit 8 Equal Groups,** you will use some mathematical practices that you may have started using in kindergarten and have continued strengthening over your school career. These practices describe types of thinking or behaviors that you might use to solve specific math problems.

Mathematical Practices	Where You Use these MPs
MP1 Make sense of problems and persevere in solving them.	Lesson 6 and 8
MP2 Reason abstractly and quantitatively.	Lesson 3, 9, 10, and 13
MP3 Construct viable arguments and critique the reasoning of others.	Lesson 5 and 8
MP4 Model with mathematics.	Lesson 8 and 14
MP5 Use appropriate tools strategically.	

Mathematical Practices	Where You Use these MPs
MP6 Attend to precision.	Lesson 1, 7, 8, and 11
MP7 Look for and make use of structure.	Lesson 1, 2, 3, 8, and 12
MP8 Look for and express regularity in repeated reasoning.	Lesson 2, 4, 5, and 11

The California Common Core State Standards for Mathematics (CA CCSSM) describe the topics you will learn in this unit. Many of these topics build upon knowledge you already have and challenge you to expand upon that knowledge. The table below shows what standards are being addressed in this unit.

Big Ideas You Are Studying	California Content Standards	Lessons Where You Learn This
• Number Strategies	**2.OA.2** Fluently add and subtract within 20 using mental strategies.2 By end of Grade 2, know from memory all sums of two one-digit numbers.	Lesson 4, 5, 6, 10, 13, and 14

Big Ideas You Are Studying	California Content Standards	Lessons Where You Learn This
• Skip Counting to 100	**2.OA.3** Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.	Lesson 1, 2, 3, 4, 5, 9, 10, and 11
• Skip Counting to 100 • Squares in an Array	**2.OA.4** Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.	Lesson 7, 8, 9, 10, 11, 12, and 14
• Represent Data • Dollars and Cents	**2.NBT.2** Count within 1000; skip-count by 2s, 5s, 10s, and 100s.	Lesson 5, 6, and 10

Big Ideas You Are Studying	California Content Standards	Lessons Where You Learn This
• Represent Data • Skip Counting to 100 • Seeing fractions in Shapes • Squares in an Array	**2.G.2** Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.	Lesson 11 and 12

Addressing CA CCSSM 2.OA.3; building towards 2.OA.3; practicing MP6 and MP7

Can You Share?

Let's equally share groups of objects.

Warm-up

Notice and Wonder: Sharing Is Caring

What do you notice? What do you wonder?

Activity 1

My Fair Share

Choose a container. Share the counters equally with your partner. Then complete the table.

total	my share	my partner's share	number of leftovers

Activity 2

Share the Marbles

Andre has 17 marbles. He wants to play a game with his sister. They each need to start with the same number of marbles. They want to use as many as they can.

1. How many marbles do Andre and his sister each get? Do they use all the marbles? Show your thinking using drawings, numbers, or words.

2. What if Andre had 18 marbles? How many would each player get? Would they use all of the marbles? Show your thinking using drawings, numbers, or words.

3. What if Andre had 20 marbles? How many would each player get? Would there be any marbles left over?

Addressing CA CCSSM 2.OA.3; building towards 2.OA.3; practicing MP7 and MP8

Partners Make Pairs

Let's make pairs with groups of objects.

Warm-up

Which Three Go Together: Laundry Day

Which 3 go together?

A

B

C

D

Activity 1

Pair Up

Make pairs with 1 yellow counter and 1 red counter.

my counters	total counters	leftover counters

Activity 2

Are You Feeling Left Out?

Show your thinking using objects, drawings, numbers, or words.

1. There are 18 students in Clare's class. Can everyone be in a group of 2?

2. There are 20 students in Priya's class. Can everyone be in a group of 2?

3. There are 19 students in Noah's class. Can everyone be in a group of 2?

Addressing CA CCSSM 2.OA.3; building on 2.NBT.2; building towards 2.OA.3; practicing MP2 and MP7

Is It Odd or Even?

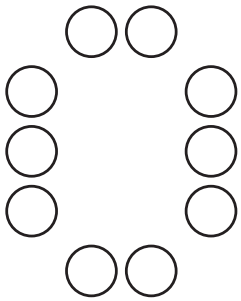
Let's explain why the number of objects in a group is even or odd.

Activity 1

Color by Number

Han wants to color a design with the same number of yellow and blue shapes.

A



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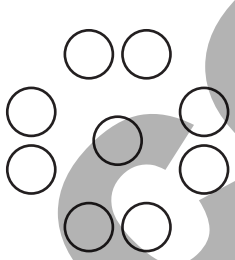

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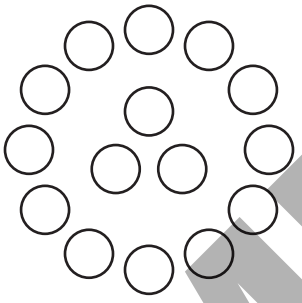

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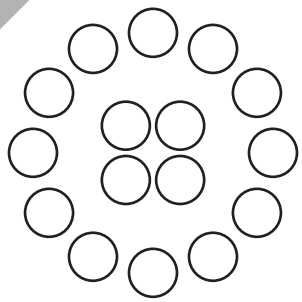

1. Which designs can Han use? Show your thinking using objects, drawings, numbers, or words.

2. Draw a circle design that would work for Han. Then draw a circle design that would ***not*** work for Han.

If you have time:

Priya draws a design with 6 circles, 3 triangles, and 3 squares. Can Han color it the way he wants? Show your thinking using objects, drawings, numbers, or words.

Activity 2

Card Sort: Even or Odd

Your teacher will give you a set of cards.

1. Take turns sorting your cards into 2 groups. Make 1 group that shows even numbers and 1 group that shows odd numbers.

   Explain your thinking to your partner.

2. Now sort the cards into groups that show the same number. How do the cards in each group show whether the number is even or odd?

   Explain your thinking to your partner.

Addressing CA CCSSM 2.OA.2, 2.OA.3; building on 2.OA.2; practicing MP8

Decompose Even and Odd Numbers

Let's represent even and odd numbers.

Warm-up

Number Talk: Equal Addends

Find the value of each expression mentally.

- 6 + 6
- 7 + 7
- 7 + 8
- 8 + 9

Activity 1

Share in Different Ways

1. Kiran has 12 stickers. He wants to give them all to 2 friends. Show different ways Kiran can share the stickers.

   a. Can both friends get the same number of stickers?

      12 = _____ + _____

   b. Can both friends get an even number of stickers?

      12 = _____ + _____

c. Can both friends get an odd number of stickers?

12 = _____ + _____

d. Can 1 friend get an even number of stickers and the other get an odd number?

12 = _____ + _____

2. Lin has 14 stickers. She wants to give them all to 2 friends.

   a. Can both friends get the same number of stickers?

      14 = _____ + _____

   b. Can both friends get an even number of stickers?

      14 = _____ + _____

   c. Can both friends get an odd number of stickers?

      14 = _____ + _____

   d. Can 1 friend get an even number of stickers and the other get an odd number?

      14 = _____ + _____

3. Noah has 15 stickers. He wants to give them all to 2 friends.

   a. Can both friends get the same number of stickers?

      15 = _____ + _____

   b. Can both friends get an even number of stickers?

      15 = _____ + _____

   c. Can both friends get an odd number of stickers?

      15 = _____ + _____

   d. Can 1 friend get an even number of stickers and the other get an odd number?

      15 = _____ + _____

Activity 2

Represent Numbers with 2 Addends

1. Pick a number between 0 and 20.
2. Tell if your number is even or odd.
3. Complete the equation. Show your number as the sum of 2 equal addends. If you can't, use 2 addends that are as close as possible.
4. Repeat for all the numbers 0 to 20.

even	odd
_____ = _____ + _____	_____ = _____ + _____
_____ = _____ + _____	_____ = _____ + _____
_____ = _____ + _____	_____ = _____ + _____
_____ = _____ + _____	_____ = _____ + _____
_____ = _____ + _____	_____ = _____ + _____
_____ = _____ + _____	_____ = _____ + _____
_____ = _____ + _____	_____ = _____ + _____
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_____ = _____ + _____	_____ = _____ + _____
_____ = _____ + _____	_____ = _____ + _____

Section A Summary

We learned that groups of objects have either an even number or an odd number of items.

- An **even** number of objects can be split into 2 equal-size groups or into groups of 2 with no objects left over.
- An **odd** number of objects always has 1 object left over when you try to make 2 equal-size groups or groups of 2.

We also represented even numbers as equations with 2 equal addends.

Odd

$3 + 3 + 1 = 7$

Even

$4 + 4 = 8$

Addressing CA CCSSM 2.OA.2, 2.OA.3, 2.NBT.2; building on 2.OA.2; building towards 2.OA.3; practicing MP3 and MP8

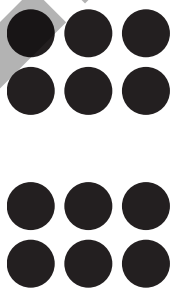
Patterns with Even and Odd Numbers

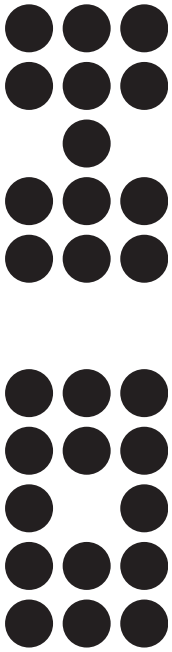
Let's look for patterns with even and odd numbers.

Warm-up

How Many Do You See: Even or Odd

How many do you see? How do you see them?





Activity 1

Even and Odd Roundabout

What did you notice? What do you wonder?

Activity 2

Presto Chango

1. In the first column of your sheet, record whether each student has an even or odd number of counters. Circle your choice. Show your thinking using drawings, numbers, or words.

2. Complete the gray column. Does adding 1 change if the number of counters is even or odd? Show your thinking using drawings, numbers, or words.

3. Complete the last column. Does adding 2 change whether the number of counters is even or odd? Show your thinking using drawings, numbers, or words.

Addressing CA CCSSM 2.NBT.2, 2.OA.2; building towards 2.OA.4; practicing MP1

Center Day 1

Let's skip-count and practice addition and subtraction.

Warm-up

Number Talk: 2 More

Find the value of each expression mentally.

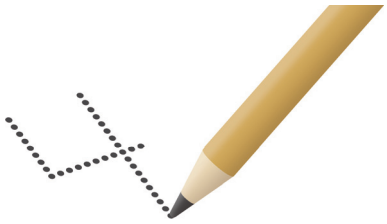
- 2 + 2 + 2
- 2 + 2 + 2 + 2
- 2 + 2 + 2 + 2 + 2
- 2 + 2 + 2 + 2 + 2 + 2

Activity 2

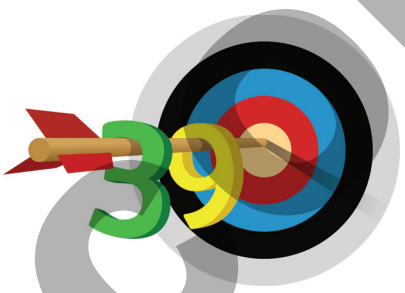
Centers: Choice Time

Choose a center.

Write Numbers



Target Numbers



Five in a Row

How Close

☐☐ + ☐☐ = _____

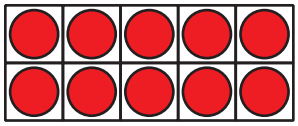
Practice Problems

10 Problems

1 Pre-unit

How many dots do you see?

a.



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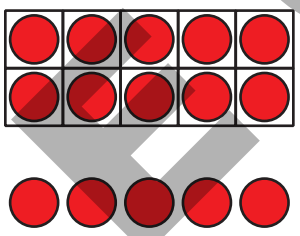

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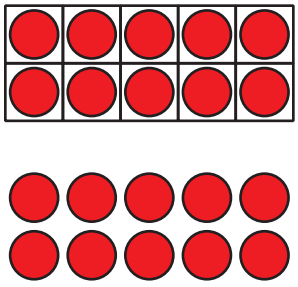


2 Pre-unit

Select **3** correct equations.

A. $6 + 6 + 6 = 18$

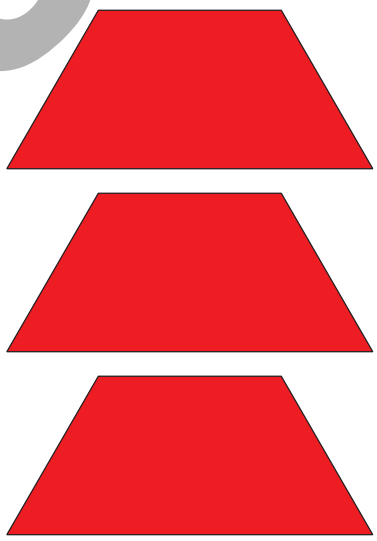
B. $4 + 4 + 4 = 16$

C. $3 + 3 + 3 = 9$

D. $7 + 7 + 7 = 20$

E. $5 + 5 + 5 = 15$

3 Here are some pattern blocks.



How many corners do the blocks have in all? Show your thinking using drawings, numbers, or words.

4 from Unit 8, Lesson 1

a. Noah and Lin have 13 crayons. Can they share all of them equally with no leftovers? Show your thinking using drawings, numbers, or words.

b. Noah and Lin have 16 colored pencils. Can they share all of them equally with no leftovers? Show your thinking using drawings, numbers, or words.

5 from Unit 8, Lesson 2

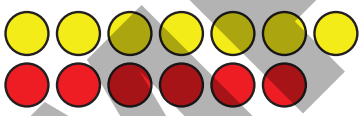
Mai plans a dance. She wants everyone to dance in pairs. For each number of students, decide if everyone can dance with a partner. Show your thinking using drawings, numbers, or words.

a. 14
b. 17
c. 18

6 from Unit 8, Lesson 3

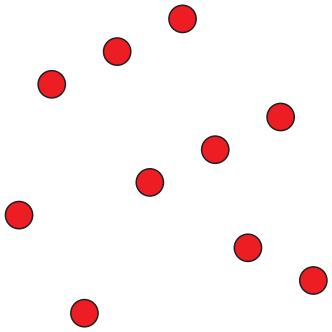
For each image, decide if the number of dots is even or odd. Show your thinking using drawings, numbers, or words.

a.



b.

c.



7 from Unit 8, Lesson 4

Decide if each number is even or odd. If it is even, write the number as a sum of 2 equal addends.

a. 12

b. 15

c. 18

8 from Unit 8, Lesson 4

Does each expression represent an even number or an odd number? Show your thinking using drawings, numbers, or words.

a. $5 + 5$

b. $6 + 6 + 1$

c. $10 + 10$

9 Exploration

This design is called the “flower of life.”

It is made of shapes that look like this. 

a. Is the number of these shapes in the design even or odd? Show your thinking using drawings, numbers, or words.

b. How many of the shapes are in the design? Show your thinking using drawings, numbers, or words.

10 Exploration

Look around the classroom for groups of objects. Without counting, how do you know that a group has an even number of objects? Explain your reasoning.

Addressing CA CCSSM 2.OA.4; building on 2.OA.2, 2.OA.3; building towards 2.OA.4; practicing MP6

What Is an Array?

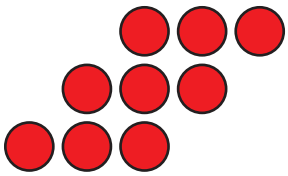
Let's learn about arrays.

Warm-up

Which Three Go Together: Counter Collections

Which 3 go together?

A



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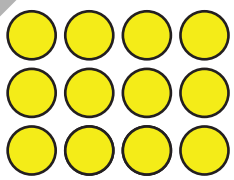
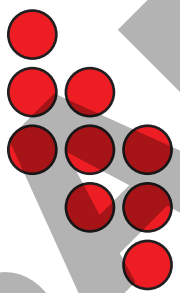


C



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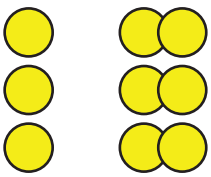


Activity 1

What Is an Array?

Arrange each set of counters into equal-size rows with no leftovers.

1. How many counters are there in all? _____
   Show or explain how you arranged them using drawings, numbers, or words.

2. How many counters are there in all? _____
   Show or explain how you arranged them using drawings, numbers, or words.

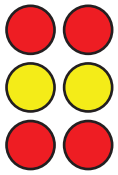
3. How many counters are there in all? _____

   Show or explain how you arranged them using drawings, numbers, or words.

Activity 2

Rows of Counters

1.



a. How many rows are in this array?

b. How many counters are in each row?

c. How many counters are there in all?

2.

a. How many rows are in this array?

b. How many counters are in each row?

c. How many counters are there in all?

3. Use 6 counters. Make 2 rows with the same number in each row. How many counters are in each row?

4. Use 20 counters. Make 4 rows with the same number in each row. How many counters are in each row?

Unit 8, Lesson 8

Addressing CA CCSSM 2.OA.4; building on 2.OA.2, 2.OA.3; building towards 2.OA.4; practicing MP1, MP3, MP4, MP6, MP7

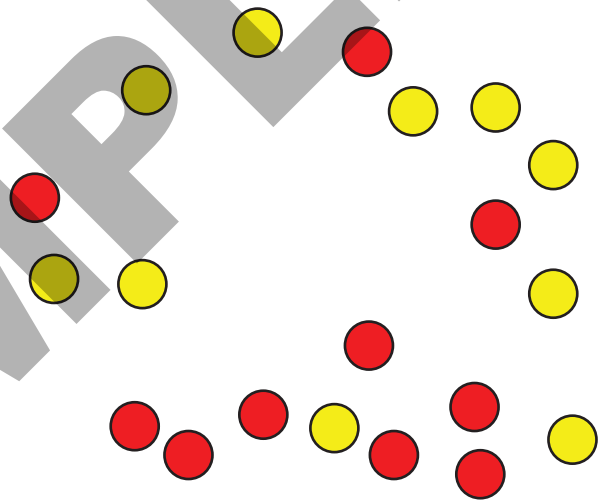
Count Columns and Objects in Columns

Let's learn about columns in arrays.

Warm-up

Estimation Exploration: Rearrange the Dots

How many counters do you see?



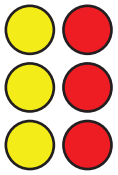
Record an estimate that is:

too low	about right	too high

Activity 1

Count by Columns

1.



a. How many columns are in this array?

b. How many counters are in each column?

c. How many counters are there in all?

2.

a. How many columns are in this array?

b. How many counters are in each column?

c. How many counters are there in all?

3. Use 10 counters. Make 2 columns with the same number in each column.

   a. How many counters are in each column?

   b. How many rows are in the array?

   c. How can you count these counters without counting by ones?

4. Use 15 counters. Make 3 columns with the same number in each column.

   a. How many counters are in each column?

   b. How many rows are in the array?

   c. How many counters are in each row?

   d. How can you count these counters without counting by ones?

Activity 2

Guess My Array

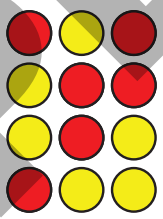
Four students make arrays.

- Han says, “My array has an even number of counters. It has 2 rows with 6 counters in each row.”
- Priya says, “My array has more than 10 counters. It has 4 rows with 3 counters in each row.”
- Elena says, “My array is very long. It has 6 counters in each column.”
- Kiran says, “My array has more columns than rows. It has 3 rows.”

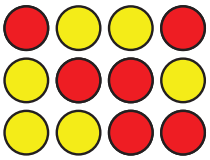
1. Write the name of each student below their array.

A

B



C



D

2. Each student used _____ counters to make an array.

3. Make an array using up to 25 counters. Don't let your partner see.

   Give your partner clues so they can try to make your array. Compare your arrays.

   How do you know the total number of counters in each array? Be prepared to explain your reasoning.

Addressing CA CCSSM 2.OA.3-4; building towards 2.OA.4; practicing MP2

A Sum of Equal Addends

Let's match expressions with arrays.

Warm-up

Estimation Exploration: How Many Waffles?

How many waffles are on the tray?

Record an estimate that is:

too low	about right	too high

How many waffles are on the tray?

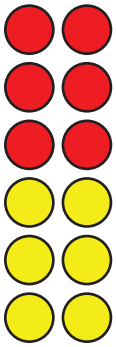
Record an estimate that is:

too low	about right	too high

Activity 1

Sums of Rows and Sums of Columns

Mai and Diego represent this array. They use different expressions.



Diego's expression

$2 + 2 + 2 + 2 + 2 + 2$

Mai's expression

$6 + 6$

Do you agree with Diego or Mai?

Show your thinking using drawings, numbers, or words.

Activity 2

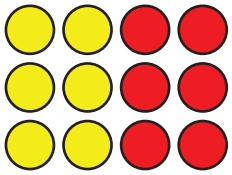
Card Sort: Arrays and Expressions

Your teacher will give you a set of cards. Match each array card with 2 expression cards and 1 number card. Be ready to explain your reasoning.

Activity 3

Add It All Up

1. a. How many counters are in the array?



b. Explain how you found the total.

c. Circle **2** expressions that represent the array.

$3 + 3 + 3 + 3$

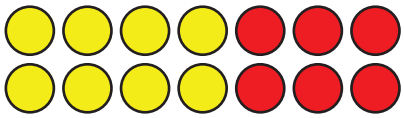
$3 + 3 + 3$

$4 + 3$

$4 + 4 + 4$

$4 + 4 + 4 + 4$

2. a. How many counters are in the array?



b. Explain how you found the total.

c. Circle **2** expressions that represent the array.

$2 + 2 + 2 + 2 + 2 + 2 + 2$

$6 + 6$

$7 + 7$

$2 + 2 + 2 + 2 + 2$

Addressing CA CCSSM 2.NBT.2, 2.OA.2-4; practicing MP2

Write Expressions and Equations to Represent Arrays

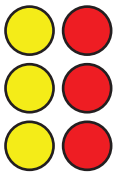
Let's write equations to represent arrays.

Warm-up

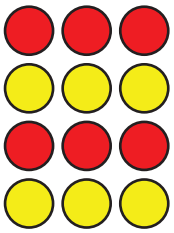
True or False: Expressions That Represent Arrays

Decide if each statement is true or false. Be prepared to explain your reasoning.

- $2 + 2 + 2 = 3 + 3$



- $4 + 4 + 4 = 3 + 3 + 3 + 3$



- $5 + 5 + 5 = 3 + 3 + 3$

Activity 1

Build Arrays and Write Equations

1. Use 20 counters. Make an array with 4 rows.

   a. How many columns does your array have?

   b. Fill in the blanks. Create equations with equal addends to represent the array.

   _____ + _____ + _____ + _____ = _____

   _____ + _____ + _____ + _____ + _____ = _____

2. Use 15 counters. Make an array with 3 columns.

   a. How many rows does your array have?

b. Fill in the blanks. Create equations with equal addends to represent the array.

_____ + _____ + _____ + _____ + _____ = _____

_____ + _____ + _____ = _____

3. Choose an even number of counters between 6 and 24. Make an array.

a. How many rows does your array have?

b. How many columns does your array have?

c. Write equal addends equations to represent the array.

Activity 2

Arrange Veggies to Make Arrays

1. Make an array that shows how to plant 9 potatoes. Draw the array. Write an equation to represent it.

2. Make an array that shows how to plant 16 carrot seeds. Draw the array. Write an equation to represent it.

3. Make an array that shows how to plant 15 potatoes. Draw the array. Write an equation to represent it.

4. Make an array that shows how to plant 12 carrot seeds. Draw the array. Write an equation to represent it.

Addressing CA CCSSM 2.G.2, 2.OA.3-4; building towards 2.G.2; practicing MP6 and MP8

Arrays and Rectangles

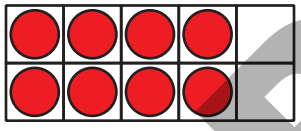
Let's make arrays and rectangles using tiles.

Warm-up

Which Three Go Together: All Kinds of Arrays

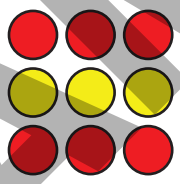
Which 3 go together?

A

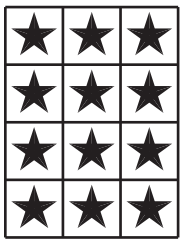


B

C



D



Activity 1

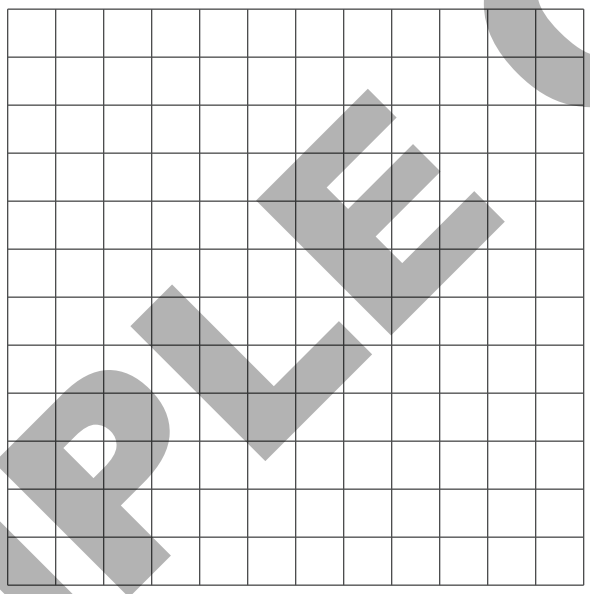
Use Tiles to Make Arrays

Choose a number of tiles.

12 15 16 18 20

Arrange all the tiles in an array. Then push them together to make a rectangle.

1. Shade squares on this grid to show the rectangle.



2. How many rows of squares does your rectangle have?
   _____

3. How many columns does your rectangle have? _____

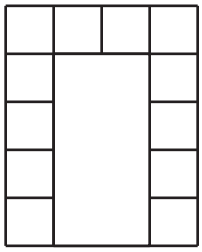
4. How many squares are in your rectangle? _____

5. Write 2 equations to represent the number of squares in your rectangle.

Activity 2

Make Equal-Size Squares

1. a. Draw lines to fill the rectangle with equal-size squares.



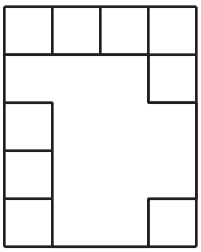
b. Color the rows different colors.

c. How many rows of equal-size squares are there?

d. How many squares are in each row?

e. Write an equation to represent the sum of the squares in each row.

2. a. Draw lines to fill the rectangle with equal-size squares.



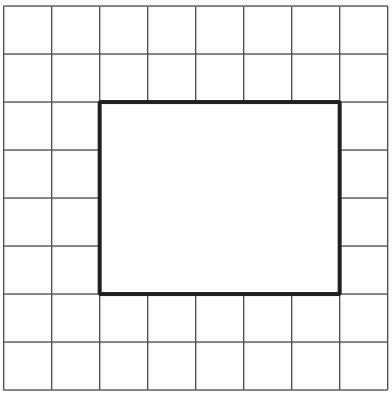
b. Color the columns different colors.

c. How many columns of equal-size squares are there?

d. How many squares are in each column?

e. Write an equation to represent the sum of the squares in each column.

3. a. Draw lines to fill the rectangle with equal-size squares.



b. How many columns of equal-size squares are there? How many squares are in each column?

c. How many rows of equal-size squares are there? How many squares are in each row?

d. Write 2 equations to represent the total number of squares in the rectangle.

Addressing CA CCSSM 2.G.2, 2.OA.4; practicing MP7

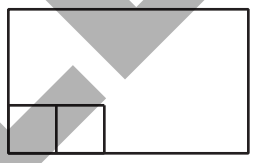
Partition Rectangles into Squares

Let's partition rectangles into squares.

Warm-up

Estimation Exploration: Fill It Up

How many squares will fill the rectangle?



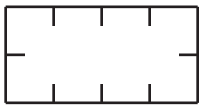
Record an estimate that is:

too low	about right	too high

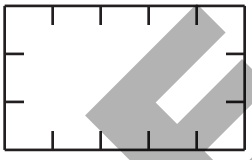
Activity 1

How Many Squares?

1. Build a rectangle with 8 tiles in 2 rows. Use a ruler to partition this rectangle to match the rectangle you built.



2. Use a ruler. Partition the rectangle using the tick marks.

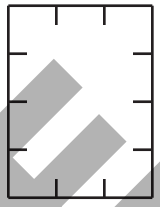


   a. How many rows of equal-size squares did you make?

b. How many columns did you make?

c. Write 2 equations to represent the total number of equal-size squares.

3. Use a ruler. Partition the rectangle using the tick marks.



a. How many rows of equal-size squares did you make?

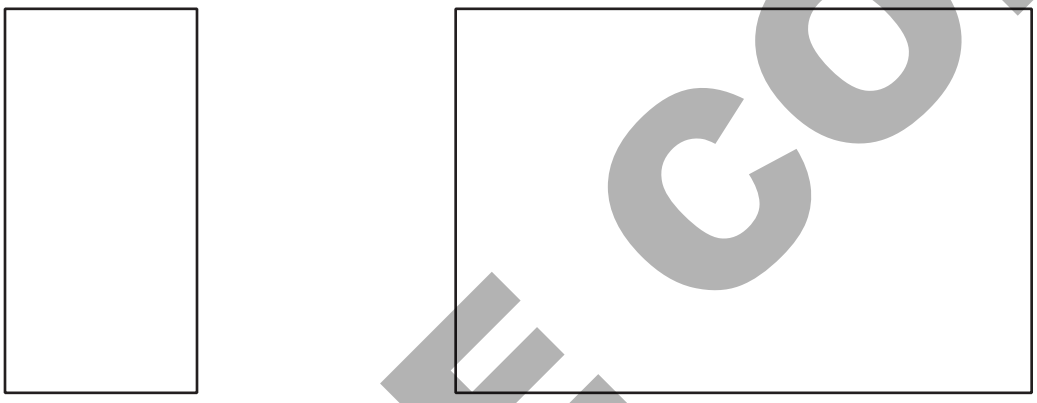
b. How many columns did you make?

c. Write 2 equations to represent the total number of equal-size squares.

Activity 2

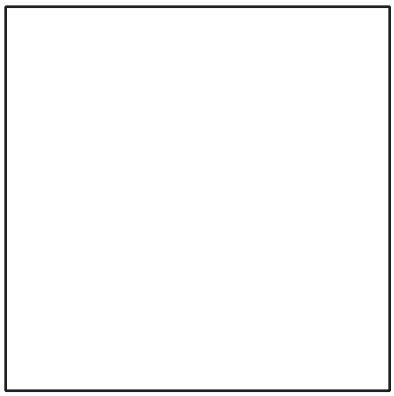
Partition Rectangles

1. Use 12 tiles to make a rectangle. Then choose 1 of these 2 rectangles. Partition it into equal-size squares to match the rectangle you made with tiles.



   a. Write 2 equations to represent the total number of squares.

2. Partition this rectangle into equal-size squares.



a. Write 2 equations to represent the total number of squares.

3. Partition this rectangle into equal-size squares.

a. Write 2 equations to represent the total number of squares.

Section B Summary

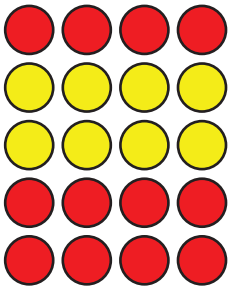
We learned that an **array** is a group of objects arranged in rows and columns. Arrays have the same number of objects in each row and in each column.

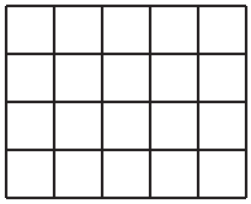
In an array:

- A **row** is a line of objects that goes side to side.
- A **column** is a line of objects that goes up and down.

We practiced counting the objects in arrays. We used expressions with equal addends to show the total number objects in an array. We added the sum of each row or the sum of each column.

We also learned that rectangles can be composed of an array of equal-size squares. Then we partitioned rectangles into rows and columns of equal-size squares.





$4 + 4 + 4 + 4 + 4 = 20$

or

$5 + 5 + 5 + 5 = 20$

Addressing CA CCSSM 2.OA.2; building on 2.OA.3-4; practicing MP2

Center Day 2

Let's skip-count and practice addition and subtraction.

Warm-up

True or False: 2 or False

Decide if each statement is true or false. Be prepared to explain your reasoning.

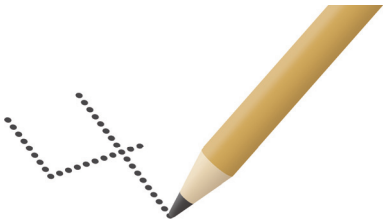
- $2 + 2 + 2 + 2 = 4 + 4$
- $2 + 2 + 2 = 3 + 3$
- $2 + 2 + 2 + 2 + 2 + 2 = 5 + 5$

Activity 1

Centers: Choice Time

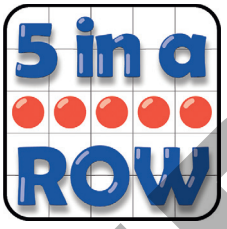
Choose a center.

Write Numbers

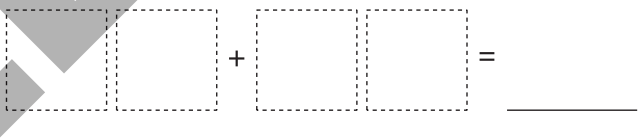


Target Numbers

Five in a Row



How Close



Addressing CA CCSSM 2.OA.2, 2.OA.4; building on 2.OA.4; practicing MP4

A Band Concert

Let's arrange seats for a concert.

Warm-up

Which Three Go Together: Represent Arrays

Which 3 go together?

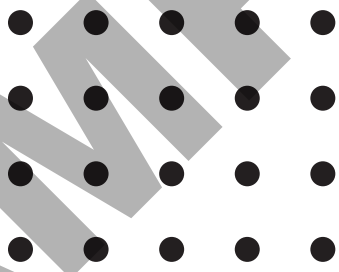
A.

$10 + 10$

B.

$10 + 5 + 5$

C.



D.

$5 + 5 + 5$

Activity 1

How Can They Sit?

Show all the ways a teacher can arrange 24 chairs in an array.

Activity 2

My Seating Recommendation

I recommend setting up the chairs this way.

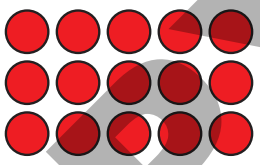
I think this is the best way because

Practice Problems

8 Problems

1 from Unit 8, Lesson 7

a. How many counters are in each row?



b. How many rows are there?

c. How many counters are there in all?

2 from Unit 8, Lesson 8

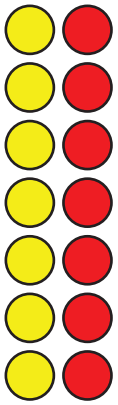
a. Clare builds an array with 16 counters. She says, "The array has only 2 columns, and it's really long."

How many counters are in each column?

b. Build a different array with 16 counters. Describe your array.

3 from Unit 8, Lesson 9

a. Circle the **2** expressions that represent the array.



$7 + 7 + 7 + 7 + 7 + 7 + 7$

$7 + 7$

$2 + 2 + 2 + 2 + 2 + 2 + 2$

$2 + 2$

b. How many counters are in the array?

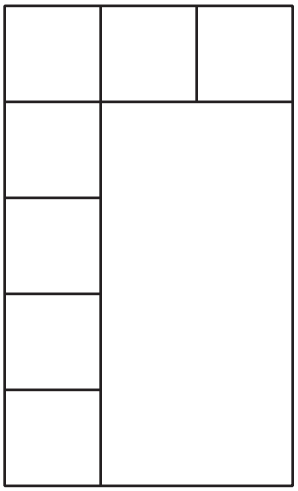
4 from Unit 8, Lesson 10

a. Make an array with 15 counters.

b. Write 2 equations with equal addends to show the total number of counters.

5 from Unit 8, Lesson 11

a. Partition this rectangle into equal-size squares.



b. How many columns of squares are there?

How many squares are in each column?

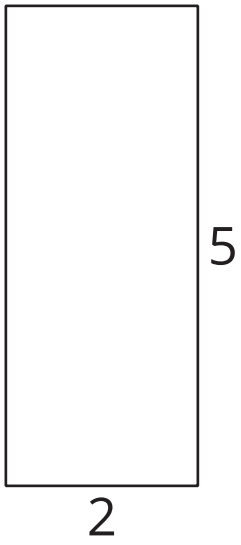
c. How many rows of squares are there?

How many squares are in each row?

d. Write 2 equations to represent the number of squares in the array.

6 from Unit 8, Lesson 12

a. Partition the rectangle into equal-size squares.



b. Write 2 equations to represent the number of squares in the array.

7 Exploration

Solar panels collect energy from the sun. Look at these solar panels. They have different arrays.

a. Describe some arrays you see in the panels. How many equal-size rectangles are in each array?

b. Write an equation for the number of equal-size rectangles in each array.

8

a. What are some things in your classroom or at home that come in arrays?

b. Choose 1 of the arrays. Find the number of rows and columns. Then find the total number of objects.

GRADE 2

UNIT

9

Putting It All Together

Content Connections

In this unit you will review what you have learned throughout the year including addition and subtraction within 100, composing and decomposing three-digit numbers, and solving story problems. You will make connections by:

- **Exploring Changing Quantities** while adding and subtracting withing 100 using different strategies.
- **Discovering Shape and Space** while working with arrays to understand multiplication.

- **Taking Wholes Apart, Putting Parts Together** while skip counting, comparing and contrasting different strategies to solve story problems, and using place value to understand three-digit numbers.
- **Reasoning with Data** while interpreting data in different representations such as number lines, graphs and drawings.

Addressing the Standards

As you work your way through **Unit 9 Putting It All Together,** you will use some mathematical practices that you may have started using in kindergarten and have continued strengthening over your school career. These practices describe types of thinking or behaviors that you might use to solve specific math problems.

Mathematical Practices	Where You Use these MPs
MP1 Make sense of problems and persevere in solving them.	Lesson 8
MP2 Reason abstractly and quantitatively.	Lesson 1, 4, 5, 7, 10, 11, 12
MP3 Construct viable arguments and critique the reasoning of others.	Lesson 13
MP4 Model with mathematics.	Lesson 10, 12
MP5 Use appropriate tools strategically.	Lesson
MP6 Attend to precision.	Lesson 8, 13

Mathematical Practices	Where You Use these MPs
MP7 Look for and make use of structure.	Lesson 2, 3, 5, 6, 9
MP8 Look for and express regularity in repeated reasoning.	Lesson 9, 13

The California Common Core State Standards for Mathematics (CA CCSSM) describe the topics you will learn in this unit. Many of these topics build upon knowledge you already have and challenge you to expand upon that knowledge. The table below shows what standards are being addressed in this unit.

Big Ideas You Are Studying	California Content Standards	Lessons Where You Learn This
• Problem Solving with Measure • Number Strategies	**2.OA.1** Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.	Lesson 9, 10, 11, 12, and 13

Big Ideas You Are Studying	California Content Standards	Lessons Where You Learn This
• Number Strategies	**2.OA.2** Fluently add and subtract within 20 using mental strategies.2 By end of Grade 2, know from memory all sums of two one-digit numbers.	Lesson 1, 2, 3, 4, and 9
• Measure and Compare Objects • Problem Solving with Measure	**2.MD.1** Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.	Lesson 3 and 4
• Measure and Compare Objects • Problem Solving Measure	**2.MD.4** Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.	Lesson 3

Big Ideas You Are Studying	California Content Standards	Lessons Where You Learn This
• Dollars and Cents • Problem Solving with Measure	**2.MD.5** Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.	Lesson 3
• Measure and Compare Objects • Represent Data • Problem Solving with Measure	**2.MD.9** Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.	Lesson 4

Big Ideas You Are Studying	California Content Standards	Lessons Where You Learn This
• Dollars and Cents • Problem Solving with Measure • Skip Counting to 100	**2.NBT.1** Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases: a. 100 can be thought of as a bundle of ten tens—called a "hundred." b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).	Lesson 5 and 6
• Skip Counting to 100	**2.NBT.3** Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.	Lesson 6

Big Ideas You Are Studying	California Content Standards	Lessons Where You Learn This
• Dollars and Cents • Number Strategies	**2.NBT.5** Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relation-ship between addition and subtraction.	Lesson 4, 7, 8, 9, 10, 11, 12, and 13
• Dollars and Cents • Problem Solving with Measure • Skip Counting to 100 • Number Strategies	**2.NBT.7** Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.	Lesson 7 and 8

Big Ideas You Are Studying	California Content Standards	Lessons Where You Learn This
• Dollars and Cents • Skip Counting to 100	**2.NBT.9** Explain why addition and subtraction strategies work, using place value and the properties of operations.	Lesson 9

Addressing CA CCSSM 2.OA.2; practicing MP2

Sums and Differences within 20

Let's find the value of sums and differences mentally.

Warm-up

Number Talk: Subtract within 20

Find the value of each expression mentally.

- 10 – 5
- 11 – 5
- 12 – 6
- 13 – 6

Activity 1

Check Yourself

1. Find the value of each sum mentally.

$6 + 6$	$7 + 9$	$8 + 6$
$9 + 9$	$6 + 8$	$3 + 9$
$7 + 7$	$9 + 2$	$5 + 6$
$8 + 8$	$7 + 5$	$9 + 5$
$5 + 5$	$8 + 4$	$5 + 9$
$9 + 8$	$2 + 9$	$9 + 6$
$7 + 8$	$9 + 7$	$8 + 9$
$8 + 5$	$6 + 9$	$6 + 7$
$6 + 5$	$8 + 3$	$5 + 7$
$7 + 6$	$9 + 4$	$8 + 7$

2. Circle any sum you didn't recall right away.

   Write each sum you circled on an index card.

   Use the index cards to build fluency.

Activity 2

Spin and Find the Unknown Number

Directions:

- Spin the top spinner to get your total.
- Spin the bottom spinner to get 1 addend.
- Find the unknown addend.
- Write an equation to show how you found the unknown addend.

my equations	my partner's equations

Addressing CA CCSSM 2.OA.2; practicing MP7

Fluency Flip

Let's add and subtract fluently.

Warm-up

True or False: Sums within 20

Decide if each statement is true or false. Be prepared to explain your reasoning.

- $8 + 5 = 8 + 2 + 5$

- $8 + 5 = 8 + 2 + 3$

- $8 + 5 = 10 + 3$

Activity 1

Heads Up: Make 20

Directions:

- Partner A holds a card on their forehead without looking.
- Partner B names the number you must add to the number on the card to get 20.
- Partner A says the number on their card.
- Record an equation to represent how you found the unknown addend.

my equations	my partner's equations

Addressing CA CCSSM 2.MD.1, 2.MD.4, 2.MD.5, 2.OA.2; practicing MP7

Measure on a Map

Let's add and subtract length measurements.

Warm-up

Notice and Wonder: From Sea to Shining Sea

What do you notice? What do you wonder?

Activity 1

Measure on the Map

Draw 3 lines on the map to show each trip. Each line should connect 2 cities. Measure the length of each line in centimeters.

1. Noah's Trip
    a. Trenton, New Jersey, to Harrisburg, Pennsylvania: _____ cm
    b. Harrisburg to Indianapolis, Indiana: _____ cm
    c. Indianapolis to St. Paul, Minnesota: _____ cm
2. Diego's Trip
    a. Sacramento, California, to Phoenix, Arizona: _____ cm
    b. Phoenix to Santa Fe, New Mexico: _____ cm
    c. Santa Fe to Topeka, Kansas: _____ cm

3. Lin's Trip

   a. Austin, Texas, to Oklahoma City, Oklahoma: _____ cm

   b. Oklahoma City to Nashville, Tennessee: _____ cm

   c. Nashville to Augusta, Maine: _____ cm

4. Find the total length of the 3 lines for each trip. Represent the total with an equation.

   a. Lin's total

   b. Diego's total

   c. Noah's total

Activity 2

How Much Longer?

Use your total line lengths from the first activity. Represent each question with an equation. Use a ? for the unknown length. Then find the unknown length.

1. How much shorter is Diego's total than Lin's?

2. How much longer is Diego's total than Noah's?

3. How much shorter is Noah's total than Lin's?

Addressing CA CCSSM 2.MD.1, 2.MD.9, 2.NBT.5, 2.OA.2; building on 2.MD.9; practicing MP2

Measure and Plot

Let's create line plots and add and subtract measurements of length.

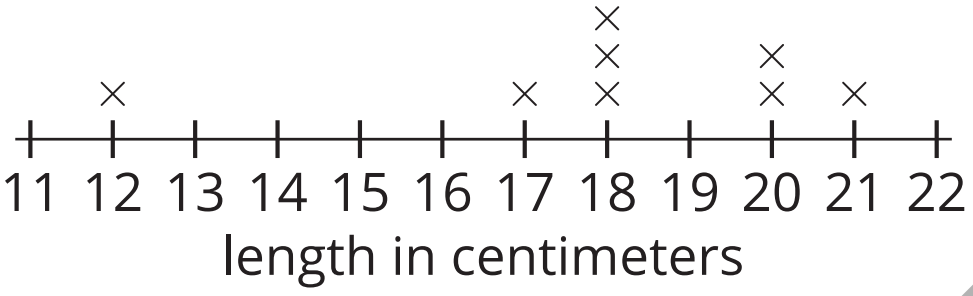
Warm-up

Notice and Wonder: Line Plots

What do you notice? What do you wonder?

patient	foot length in centimeters
A	12
B	18
C	20
D	18
E	18
F	20
G	17
H	21

Length of Patient's Feet



Activity 1

May I Sharpen My Pencil?

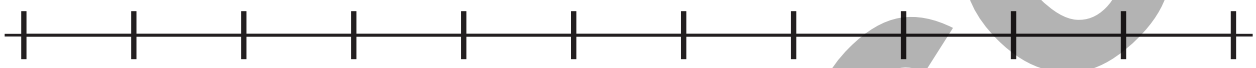
group	length of pencils in centimeters				total length
A	8	13	12	7	
B	9	15	7	10	
C	12	13	8	6	
D	9	9	11	13	
E					

1. Measure the length of your pencil. _____ cm
2. Write the lengths of your group's pencils in the last row of the table.
3. Find the total length of each group's pencils.

Activity 2

A Plot Twist

1. Use the pencil measurements to create a line plot.



2. What is the most common pencil length? _____
3. What is the shortest pencil length? _____
4. How many pencils are longer than 10 cm? _____
5. What is the difference between the longest pencil and the shortest pencil? Write an equation to represent the difference.

6. What is the difference between the shortest pencil and the length of an unsharpened pencil? Write an equation to represent the difference.

Unit 9, Lesson 5

Addressing CA CCSSM 2.NBT.1; building on 2.NBT.1; practicing MP2 and MP7

Compose and Decompose Numbers within 1,000

Let's represent numbers in many different ways.

Sec B

Warm-up

What Do You Know about 308?

What do you know about 308?

Activity 1

How Many Did You Get?

1. Start with 2 hundreds. Then grab a handful of tens and of ones.

   a. What number do your base-ten blocks represent? _____
   b. Represent the same number in another way. Show your thinking using drawings, numbers, or words.

2. Combine your blocks with your partner's blocks.

   a. What number do your group's base-ten blocks represent? _____
   b. Represent the same number in another way. Show your thinking using drawings, numbers, or words.

3. Represent your group's number in the following ways:

   a. without hundreds

   b. without tens

   c. without hundreds or tens

Activity 2

Let Me Count the Ways

1. Represent 356 in at least 3 ways. Show your thinking using drawings, numbers, or words.

2. Create a poster with your group to show 356 in different ways.

Addressing CA CCSSM 2.NBT.1, 2.NBT.3; building on 2.NBT.4; practicing MP7

Represent Numbers with Expressions

Let's compose and decompose numbers to make expressions with the same value.

Warm-up

True or False: Place Value

Decide if each statement is true or false. Be prepared to explain your reasoning.

- 5 hundreds + 2 tens + 7 ones = 527
- 4 hundreds + 12 tens + 7 ones = 527
- 5 hundreds + 7 ones + 2 tens = 527

Activity 1

Make Equations True

Find the number that makes each equation true.

1. 5 hundreds + _____ tens + 6 ones = 5 hundreds + 5 tens + 16 ones

2. 1 hundred + 1 ten + 17 ones = 1 hundred + _____ tens + 7 ones

3. 4 hundreds + 15 tens + 3 ones = _____ hundreds + 5 tens + 3 ones

4. 4 hundreds + 3 tens + 7 ones = 3 hundreds + _____ tens + 7 ones

5. 7 hundreds + 8 tens + 4 ones = 7 hundreds + 7 tens + _____ ones

6. 6 hundreds + 9 ones = 5 hundreds + _____ tens + 9 ones

7. 2 hundreds + 9 tens + 17 ones = _____ hundreds + 7 ones

8. 3 hundreds + 1 ten + 5 ones = 2 hundreds + 10 tens + _____ ones

If You Have Time: Make your own equation with a missing value for your partner.

Activity 2

Card Sort: Expressions with 3-Digit Values

Your teacher will give you a set of cards. Group them into sets of expressions that have the same value.

Record the letters of the matching cards. Write a new expression that represents the same value.

1. letters for matching expressions: _____
   new expression:

   _____

2. letters for matching expressions: _____
   new expression:

   _____

3. letters for matching expressions: _____
   new expression:

   _____

4. letters for matching expressions: _____
   new expression:

   _____

Addressing CA CCSSM 2.NBT.5, 2.NBT.7; practicing MP2

Add and Subtract within 1,000

Let's add and subtract within 1,000.

Warm-up

Which Three Go Together: Add and Subtract within 100

Which 3 go together?

A

74 – 23

B

24 + 37

C

4 tens + 2 ones + 3 tens + 7 ones

D

60 + 19

Activity 1

Which Would You Rather Find?

A
102 + 341

B
385 – 124

C
611 – 45

D
87 + 38

E
571 – 268

F
885 – 142

G
64 + 37

H
302 – 198

I
73 – 27

J
685 + 279

K
320 + 509

L
53 + 52

1. Circle 2 sums or differences you think are challenging. Find the value of 1 of these expressions. Show your thinking using drawings, numbers, or words.

2. Choose 2 other expressions. Find the values. Show your thinking using drawings, numbers, or words.

Activity 2

Add and Subtract within 100

1. Find the value of each expression.

A
31 + 25

B
43 + 28

C
89 – 22

D
40 – 28

E
15 + 72

F
85 – 37

G
95 – 81

H
37 + 55

I
25 + 25

J
63 – 19

K
72 – 68

L
21 + 59

2. Choose 1 value that was less challenging to find. Explain your reasoning.

3. Choose 1 value that was more challenging to find. Explain your reasoning.

Unit 9, Lesson 8

Addressing CA CCSSM 2.NBT.5, 2.NBT.7; practicing MP1 and MP6

Add and Subtract within 100

Let's fluently add and subtract within 100.

Warm-up

Number Talk: Add by Place

Find the value of each expression mentally.

- 9 + 5
- 20 + 30
- 29 + 35
- 229 + 435

Activity 1

Heads Up: Add and Subtract within 100

Play 3 rounds of the game. Write an equation that shows the value you find for each round.

Round 1:

Round 2:

Round 3:

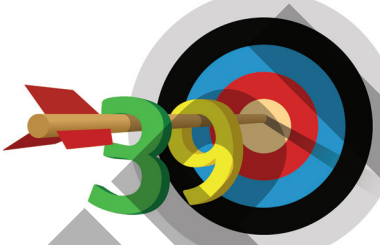
Activity 2

Centers: Choice Time

Choose a center.

Five in a Row

Target Numbers



Addressing CA CCSSM 2.NBT.5, 2.NBT.9, 2.OA.1, 2.OA.2; practicing MP7 and MP8

Sort the Story Problems

Let's analyze story problems.

Warm-up

Number Talk: Use Place Value to Subtract

Find the value of each expression mentally.

- 10 – 6
- 14 – 6
- 54 – 6
- 54 – 26

Activity 1

Card Sort: Story Problems

Your teacher will give you a set of cards that show story problems.

Sort the cards into 2 categories of your choosing. Be prepared to explain the meaning of your categories.

Activity 2

Solve Story Problems

Choose 1 of the story problems from the first activity. Solve it. Show your thinking using drawings, numbers, or words.

Unit 9, Lesson 10

Addressing CA CCSSM 2.NBT.5, 2.OA.1; building towards 2.OA.1; practicing MP2 and MP4

What's the Question?

Let's determine the question in story problems.

Warm-up

Sec C

Notice and Wonder: A Day in the Park

There are 37 kids on the soccer field. There are 18 kids on the tennis courts. There are 25 kids at the picnic tables.

What do you notice? What do you wonder?

Activity 1

Asked and Answered

Elena picks 29 apples. She picks 14 fewer apples than Han. Han picks 15 more apples than Diego.

1. Write a question someone could answer with this information.

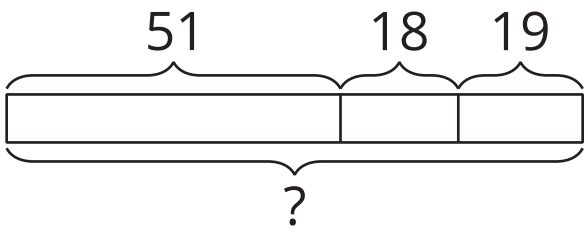
2. Answer your question. Show your thinking using drawings, numbers, or words.

Activity 2

What Is the Question?

Clare picks 51 apples. Lin picks 18 apples. Andre picks 19 apples.

1. This work shows the answer to a question about the apples.



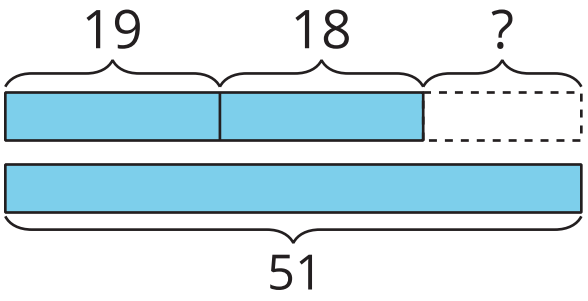
$51 + 19 = 70$

$70 + 18 = 88$

What's the question?

Explain how you know.

2. This work shows the answer to a question about the apples.



$19 + 18 = 37$

$51 - 37 = 14$

What's the question?

Explain how you know.

Unit 9, Lesson 11

Addressing CA CCSSM 2.NBT.5, 2.OA.1; practicing MP2

All about Tape Diagrams

Let's match diagrams, story problems, and equations.

Warm-up

Sec C

Number Talk: Addition and Subtraction

Find the value of each expression mentally.

- 7 + 13
- 27 + 13
- 40 – 13
- 40 – 27

Activity 1

Card Sort: Represent Story Problems

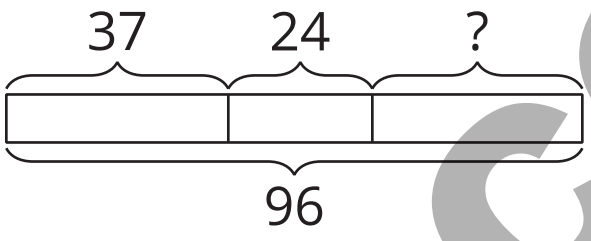
Your teacher will give you a set of cards. Match each story problem with a diagram and an equation.

Activity 2

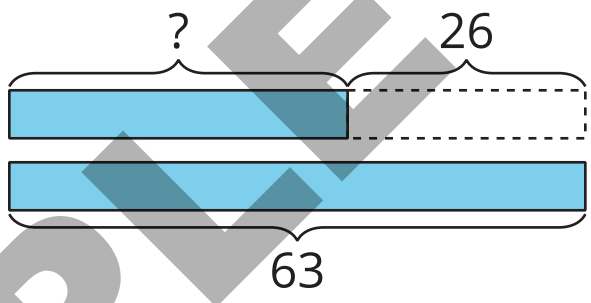
Write Stories

Choose 1 of the diagrams. Write a story problem that the diagram could represent. Solve the problem.

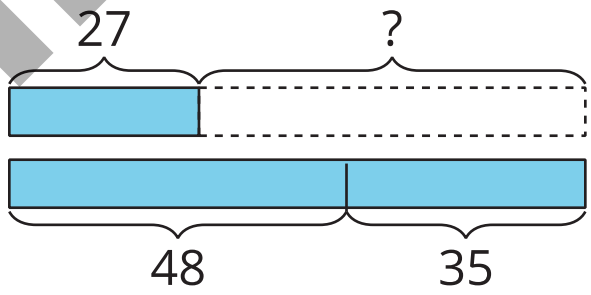
1.



2.



3.



Problem _____

Unit 9, Lesson 12

Addressing CA CCSSM 2.NBT.5, 2.OA.1; building on 2.NBT.1-4; building towards 2.OA.1 practicing MP2 and MP4

What's the Story?

Let's write story problems.

Warm-up

Sec C

Estimation Exploration: How Many People?

How many people are in the picture?

Record an estimate that is:

too low	about right	too high

Activity 1

What's the Story?

Your teacher will assign you A or B. Write a story problem that fits each equation.

A Equations	B Equations
$23 + \_\_\_\_\_ = 37$	$73 - \_\_\_\_\_ = 28$
$\_\_\_\_\_ + 9 = 45$	$\_\_\_\_\_ - 15 = 18$

Activity 2

Make Math Stories

Write a story problem.

Use 2-digit numbers.

Unit 9, Lesson 13

Addressing CA CCSSM 2.NBT.5, 2.OA.1; practicing MP3, MP6, MP8

Let's Solve Our Story Problems

Let's solve, represent, and share story problems.

Warm-up

Sec C

Number Talk: Make a Ten

Find the value of each expression mentally.

- 38 + 7
- 38 + 17
- 38 + 27
- 38 + 57

Activity 1

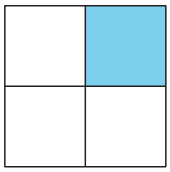
Solve Story Problems

1. Solve the story problem you wrote in an earlier lesson.

2. Make a poster about your story problem. Include:
    - Your story with the question
    - Your thinking and reasoning to solve the problem, using:
        - Pictures
        - Diagrams
        - Words
        - Expressions
    - The answer to your story problem question

Glossary

- a fourth
  One of the pieces created when a shape is split into 4 equal parts.

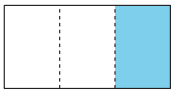


  A fourth, or a quarter, of the square is shaded.

- a half
  One of the pieces created when a shape is split into 2 equal parts.

  A half of the rectangle is shaded.

- a third
  One piece of a shape when the shape is split into 3 pieces that are the same size.



  A third of the rectangle is shaded.

- array

  An arrangement of objects in rows and columns. All the rows have the same number of objects. All the columns have the same number of objects.

- bar graph

  A way to show data using the height or length of rectangles to represent how many in each group or category.

- centimeter

  A metric unit of length.

  Examples:

  A paper clip is about 1 centimeter wide.

  A staple is about 1 centimeter long.

  A pinkie finger is about 1 centimeter wide.

- column

  In an array, a line of objects that goes up and down.

- compose

  To put a number or shape together using its parts.

Examples:
Compose 1 ten from 10 ones.
Compose 14 from 1 ten and 4 ones.
Compose 1 rectangle from two triangles.

- cube
  A solid shape with 6 square faces that are the same size.

- data
  A collection of facts, such as numbers, measurements, or observations.

  Examples:
  the color of each pencil in a box
  the number of pencils sold each day
  the length of each pencil in a box

- decompose
  To break apart a number or shape into its parts.

  Examples:
  Decompose 1 ten into 10 ones.
  Decompose 14 into 1 ten and 4 ones.
  Decompose 1 rectangle into 2 triangles.

- even

  A number that can be split into 2 equal-size groups or made into pairs without any objects left over.

- expanded form

  A way of writing a number as a sum of the values of the digits.

  Example: 482 written in expanded form is 400 + 80 + 2.

- face

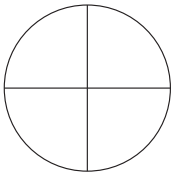
  A flat side of a solid shape.

- foot

  A U.S. unit of length.

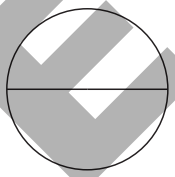
  Examples:
  A ruler is 1 foot long.
  A notebook is about 1 foot long.
  A football is about 1 foot long.

- fourths
  The pieces created when a shape is split into 4 pieces that are the same size.



  The circle is split into fourths, or quarters.

- halves
  The pieces created when a shape is split into 2 pieces that are the same size.



  The circle is split into halves.

- hexagon
  A shape with 6 straight sides and 6 corners.

- hundred
  A group of 10 tens or 100 ones.

- inch
  A U.S. unit of length.

  Examples:
  A paper clip is about 1 inch long.
  A quarter is about 1 inch wide.
  The side of a connecting cube is about 1 inch long.

- line plot
  A way to show data with Xs or other marks above a number line. Each mark represents 1 number or 1 measurement.

- meter
  A metric unit of length.

  Examples:
  A baseball bat is about 1 meter long.
  A yardstick is about 1 meter long.
  A door is about 1 meter wide.

- number line
  A diagram that represents numbers as lengths away from 0 along a straight line.

- odd

  A number is odd if that number of objects cannot be split into two equal groups or made into pairs without any objects left over.

- pentagon

  A shape with 5 straight sides and 5 corners.

- picture graph

  A way to show data using pictures or symbols to represent how many in each group or category.

- quadrilateral

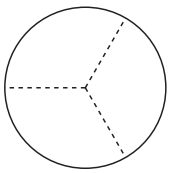
  A flat shape with 4 straight sides and 4 corners.

- row

  In an array, a line of objects that goes side to side.

- thirds

  The pieces created when a shape is split into 3 pieces that are the same size.



This circle is split into thirds.

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Notes

Notes

California Common Core State Standards for Mathematics (CA CCSSM) Reference

2.G: Grade 2 – Geometry

Reason with shapes and their attributes.

2.G.1

Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Sizes are compared directly or visually, not compared by measuring. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.

2.G.2

Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.

2.G.3

Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words *halves, thirds, half of, a third of,* etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.

2.MD: Grade 2 – Measurement and Data

Measure and estimate lengths in standard units.

2.MD.1

Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.

2.MD.2

Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.

2.MD.3

Estimate lengths using units of inches, feet, centimeters, and meters.

2.MD.4

Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.

Relate addition and subtraction to length.

2.MD.5

Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same

units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.

2.MD.6

Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram.

Work with time and money.

2.MD.7

Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m. Know relationships of time (e.g., minutes in an hour, days in a month, weeks in a year). CA

2.MD.8

Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately. Example: If you have 2 dimes and 3 pennies, how many cents do you have?

Represent and interpret data.

2.MD.10

Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve

simple put-together, take-apart, and compare problems See Glossary, Table 1. using information presented in a bar graph.

2.MD.9

Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked offinwhole-numberunits.

2.NBT: Grade 2 – Number and Operations in Base Ten

Understand place value.

2.NBT.1

Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:

2.NBT.1a

100 can be thought of as a bundle of ten tens—called a "hundred."

2.NBT.1b

The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).

2.NBT.2

Count within 1000; skip-count by 5s, 10s, and 100s.

2.NBT.3

Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.

2.NBT.4

Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.

Use place value understanding and properties of operations to add and subtract.

2.NBT.5

Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

2.NBT.6

Add up to four two-digit numbers using strategies based on place value and properties of operations.

2.NBT.7

Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition

and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.

2.NBT.7.1

Use estimation strategies to make reasonable estimates in problem solving. CA

2.NBT.8

Mentally add 10 or 100 to a given number 100-900, and mentally subtract 10 or 100 from a given number 100-900.

2.NBT.9

Explain why addition and subtraction strategies work, using place value and the properties of operations. Explanations may be supported by drawings or objects.

2.OA: Grade 2 – Operations and Algebraic Thinking

Represent and solve problems involving addition and subtraction.

2.OA.1

Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of

adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. See Glossary, Table 1.

Add and subtract within 20.

2.OA.2

Fluently add and subtract within 20 using mental strategies. See standard 1.OA.6 for a list of mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.

Work with equal groups of objects to gain foundations for multiplication.

2.OA.3

Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.

2.OA.4

Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.

California Common Core State Standards for Mathematics Standards for Mathematical Practice

These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. The first of these are the NCTM process standards of problem solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council's report *Adding It Up*: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy).

MP1. Make sense of problems and persevere in solving them.

Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous

problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.

MP2. Reason abstractly and quantitatively.

Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the

representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

MP3. Construct viable arguments and critique the reasoning of others.

Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is

flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen to or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.

- Students build proofs by induction and proofs by contradiction. CA 3.1 (for higher mathematics only).

MP4. Model with mathematics.

Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these

may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

MP5. Use appropriate tools strategically.

Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and

compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.

MP6. Attend to precision.

Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.

MP7. Look for and make use of structure.

Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a

collection of shapes according to how many sides the shapes have. Later, students will see 7×8 equals the well-remembered $7 \times 5 + 7 \times 3$, in preparation for learning about the distributive property. In the expression $x^2 + 9x + 14$, older students can see the 14 as 2×7 and the 9 as $2 + 7$. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see $5 - 3(x - y)^2$ as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers x and y.

MP8. Look for and express regularity in repeated reasoning.

Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation $(y - 2)/(x - 1) = 3$.

Noticing the regularity in the way terms cancel when expanding $(x - 1)(x + 1)$, $(x - 1)(x^2 + x + 1)$, and $(x - 1)(x^3 + x^2 + x + 1)$ might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.

Connecting the Mathematical Practices to the Standards for Mathematical Content

The Standards for Mathematical Practice describe ways in which developing student practitioners of the discipline of mathematics increasingly ought to engage with the subject matter as they grow in mathematical maturity and expertise throughout the elementary, middle and high school years. Designers of curricula, assessments, and professional development should all attend to the need to connect the mathematical practices to mathematical content in mathematics instruction.