TURN AND TALK

How is this problem similar to the one before? How is it different?

2. Dante has 4 pairs of socks. How many socks are there?

Step One Draw a picture.

Show 4 groups.

Show 2 socks in each group.

Step Two There are 4 groups of 2.

Write an addition sentence.

$2 + 2 + 2 + 2 =$ 8

Step Three Write a multiplication sentence.

$4 \times 2 =$ 8

Step Four Solve the problem.

There are 8 socks in all.

HINT, HINT

Think of the number of groups and how many are in each group.

3. Select THREE number sentences that describe the picture.

Ⓐ 2 groups of 3

Ⓑ $2 + 2 + 2$

Ⓒ 3×3

Ⓓ 3 groups of 2

Ⓔ 3×2

Ⓕ $3 + 3 + 3$

How Am I Doing?

What questions do you have?

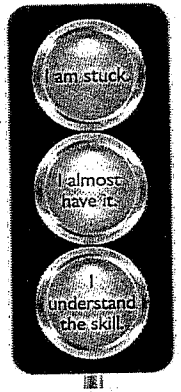
Write a number sentence to show multiplication.

Horses have 4 legs; people have 2 eyes. What are some other things that have equal groups?

SKETCH IT

In the space below, make a drawing to show multiplication.

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



WORK SPACE

INDEPENDENT PRACTICE

Answer the questions.

1. Which is another way to show 5 + 5 + 5?

   (A) 1 × 5
   (B) 5 × 2
   (C) 3 × 5
   (D) 5 × 5

2. Write a multiplication sentence that matches the picture.

   2 × 6 = 12

3. Solve.
   4 × 5 = □

   (A) 9
   (B) 20
   (C) 24
   (D) 30

4. Select TWO number sentences that show 4 groups of 3.

   (A) 4 + 3
   (B) 3 + 3 + 3 + 3
   (C) 4 × 4
   (D) 4 + 4 + 4
   (E) 3 + 3 + 3 + 4
   (F) 4 × 3

5. Solve.
   7 × 2 = □

   (A) 14
   (B) 16
   (C) 18
   (D) 20

HINT, HINT

There are 7 groups and 2 objects in each group. How many objects are there in all?

6. Part A
   Draw a picture that shows 5 groups of 3.

Sample answer:

THINK ABOUT IT

The first number tells you how many groups. What does the second number tell you?

Part B
Write an addition sentence and a multiplication sentence to match your picture. Explain your answer.

Sample answer:
3 + 3 + 3 + 3 + 3 = 15
5 × 3 = 15
My picture shows 5 groups of 3 stars and 15 stars in all. This is the same as adding 3 five times. It is also the same as multiplying 5 and 3.

WORK SPACE

Part A

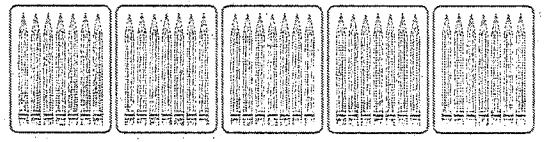
Write a word problem that can be solved using 5×7.

Sample answer: Eddie has 5 boxes of pencils. There are 7 pencils in each box. How many pencils does Eddie have in all?

Part B

Solve your word problem. Explain your answer.

Sample answer:



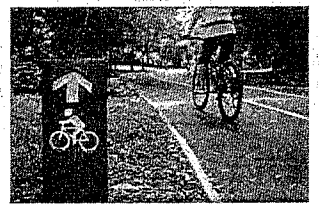
There are 5 groups of 7. $7 + 7 + 7 + 7 + 7 = 35$ $5 \times 7 = 35$ Eddie has 35 pencils in all. I drew a picture to show 5 groups of 7. I wrote an addition sentence and a multiplication sentence to match.

EXIT TICKET

3.OA.1

Now that you have learned what multiplication means and how to write a multiplication sentence, let's help Carrie solve the problem in the Real-World Connection.

Carrie is having a picnic at the park. She sees 5 bicycles parked against a tree. Each bicycle has 2 wheels. How many wheels does she see in all?



How can Carrie use multiplication to find how many wheels she sees?

Sample answer: There are 5 bicycles with 2 wheels each, so there are 5 groups of 2:

$2 + 2 + 2 + 2 + 2 = 10$

$5 \times 2 = 10$

So, Carrie sees 10 wheels in all.

2. How many groups of 2 can be made with 6 counters?

Step One Draw a picture to model the problem.

Draw 6 counters, and put 2 in each group.

There should be 3 equal groups:

Step Two Write a division sentence:

The total being divided is 6.

There are 2 in each group.

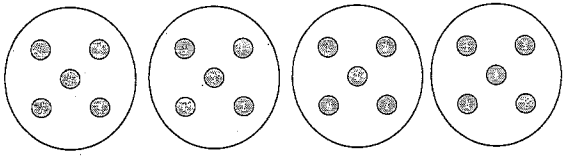
There are 3 equal groups, so 3 is the quotient.

6 ÷ 2 = 3

THINK ABOUT IT

How many objects are there altogether? How many groups are there? How many in each group?

3. Write a division sentence in which the quotient is the number of objects in each group.



20 ÷ 4 = 5

How Am I Doing?

What questions do you have?

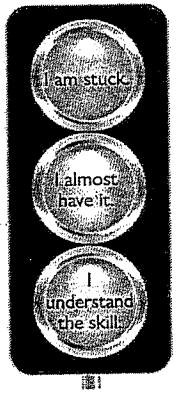
Write a number sentence to show division.

Sharing is one situation where we use division. What are other times when things would need to be divided into equal groups?

SKETCH IT

In the space below, make a drawing to show division.

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

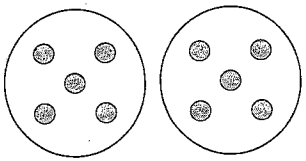


WORK SPACE

INDEPENDENT PRACTICE

Answer the questions.

1. Which sentence describes the drawing?



Ⓐ 10 ÷ 1 = 10
Ⓑ 10 ÷ 2 = 5
Ⓒ 12 ÷ 2 = 6
Ⓓ 12 ÷ 6 = 2

2. Solve.

42 ÷ 6 = ☐

Ⓐ 2
Ⓑ 6
Ⓒ 7
Ⓓ 21

3. A store has 8 shirts in equal stacks. How many shirts could be in each stack? Select TWO correct answers.

Ⓐ 2 shirts
Ⓑ 3 shirts
Ⓒ 4 shirts
Ⓓ 5 shirts
Ⓔ 6 shirts

TIPS AND TRICKS

You know from the question that two of the answers are correct. Read each answer choice and decide if you can divide 8 to make equal groups with that number of objects in each group. Use the picture to help you.

4. Find the quotient that makes the division sentence true.

24 ÷ 4 = 6

5. Solve.

27 ÷ 9 = ☐

Ⓐ 3
Ⓑ 9
Ⓒ 12
Ⓓ 18

6. Part A

Write and solve a word problem for 56 ÷ 8.

Sample answer: Becky has 56 oranges. If she puts 8 oranges in each sack, how many sacks will she fill? 56 ÷ 8 = 7

Part B

Is the quotient in your word problem the number of objects in each group or the number of groups you can make? Explain your answer.

Sample answer: The quotient is the number of equal groups I can make. This is the number of groups I can make when I separate 56 objects into equal groups with 8 objects in each group. Note: The quotient may be either the number of objects in each group or the number of groups made, depending on the way the word problem was written. Make sure the explanation given is consistent with the problem as written.

HINT, HINT

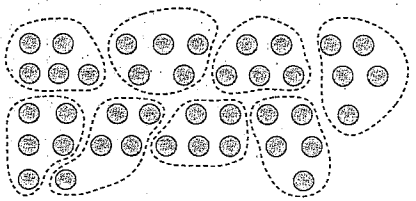
There are 24 objects in all and 4 equal groups. How many objects are in each group?

WORK SPACE

HINT, HINT

Break it down. How many objects are there altogether? How many in each group? How many groups are there?

7 Look at the drawing.



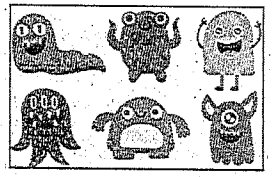
Write a division sentence in which the quotient is the number of equal groups.

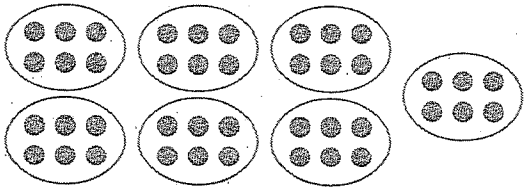
40 ÷ 5 = 8

8 Part A

Nancy has 42 stickers. She wants to give the same number of stickers to each of 7 friends. How many stickers does each friend get?

Draw a picture to model the problem.





Part B

Write a division sentence to match your picture. Explain your answer.

WORK SPACE

Sample answer:

42 ÷ 7 = 6

My picture shows 42 counters. There are 7 groups with 6 counters in each group. There are 42 stickers and 7 groups. So 7 circles were drawn with 6 counters in each circle. So, each friend gets 6 stickers.

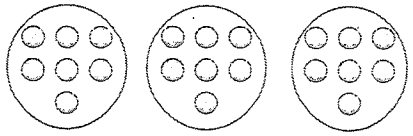
EXIT TICKET

3.OA.2

Now that you have learned what division means and how to write a division sentence, let's help Sam solve the problem in the Real-World Connection.

Sam has 21 fish and 3 fishbowls. She wants to put an equal number of fish in each bowl. How many fish go in each bowl?

Create a drawing that shows how to use division to solve the problem. Then explain your drawing and solve the problem.



Sample answer: There are 21 fish altogether, and 3 bowls. Putting one fish at a time into each bowl, there will be 7 fish in each bowl.

$21 \div 3 = 7$

2. Find the missing number: $9 = 54 \div \square$

Step One Think: What number can 54 be divided by to get a quotient of 9?

$9 = 54 \div \square$

Step Two Write the division fact.

$54 \div 6 = 9$

Step Three Write the missing number.

6

OR

Step One Think of a related multiplication fact.

$9 \times \square = 54$

Step Two Think: What number multiplied by 9 has a product of 54?

Write the multiplication fact.

$9 \times 6 = 54$

Step Three Write the missing number.

6

HINT, HINT

Put a 4 in each box and see if the equations are true.

3. Select THREE equations that are true with the number 4 in the box.

(A) $5 \times \square = 20$

(B) $36 \div \square = 9$

(C) $18 \div \square = 6$

(D) $24 = \square \times 8$

(E) $\square = 28 \div 7$

How Am I Doing?

What questions do you have?

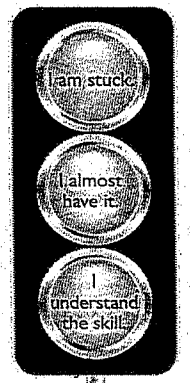
Explain how multiplication and division go together.

Describe a situation where you would use division. How would knowing multiplication facts help you?

TURN AND TALK

With a partner, find the unknown factor in this equation: You have 21 puppies. The same number of puppies were born to each of 3 mother dogs. How many puppies does each mother dog have?

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



INDEPENDENT PRACTICE

Answer the questions.

THINK ABOUT IT
What number multiplied by 6 equals 42?

WORK SPACE

1. Look at the number sentence.
   $\square \times 6 = 42$
   What number belongs in the $\square$ to make this number sentence true?
   - (A) 6
   - (B) 7
   - (C) 8
   - (D) 9

2. What is the missing number in the equation $8 \times \square = 64$?
   Write your answer in the box.
   [8]

3. Select TWO equations that are missing the number 9.
   - (A) $45 = 5 \times \square$
   - (B) $56 \div \square = 8$
   - (C) $\square = 24 \div 4$
   - (D) $\square \div 3 = 3$
   - (E) $\square = 4 \times 2$

4. Which number makes the equation true?
   $7 \times \square = 49$
   - (A) 4
   - (B) 9
   - (C) 5
   - (D) 7

5. Complete each multiplication and division equation.
   Write your answers in the boxes.

   $6 \times$ [4] $= 24$ $\quad$ $30 \div$ [6] $= 5$

   [3] $\times 7 = 21$ $\quad$ $81 \div$ [9] $= 9$

   $9 \times$ [5] $= 45$ $\quad$ $16 \div$ [8] $= 2$

THINK ABOUT IT
Multiplication puts equal groups together to make a total. Division breaks a number apart into equal groups.

WORK SPACE

6. Part A
   Jesse has 63 apple slices that he wants to share evenly among 9 friends. How many apple slices will each friend get?
   - (A) 7
   - (B) 9
   - (C) 18
   - (D) 36

Part B
Explain how you can use multiplication to solve the equation $63 \div 9 = \square$.

Sample answer: Since division and multiplication are inverse operations, I can use a related multiplication fact. I know that 9 times 7 equals 63, so 63 divided by 9 equals 7.

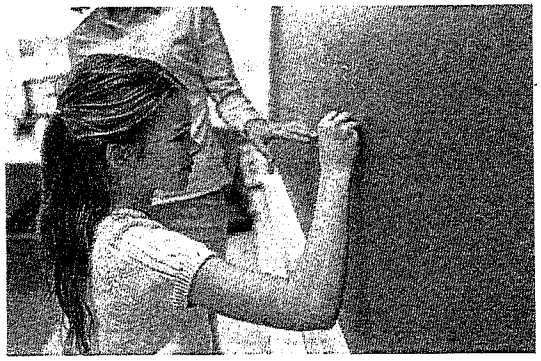
WORK SPACE

7. Emily wants to divide 8 by 2. She says she can use the related fact $8 \times 2 = 16$ because it uses the numbers 8 and 2. What mistake did Emily make? Explain your answer.

Sample answer: Emily needs to choose a multiplication fact that has 8 as the product and 2 as one of the factors, not just any fact that uses 8 and 2.

She should have used $2 \times 4 = 8$ or $4 \times 2 = 8$.

Emily also did not see that $8 \div 2$ could not have the same answer as 8×2.



EXIT TICKET

3.OA.4, 3.OA.6

Now that you have mastered the relationship between multiplication and division, let's help Amy solve the problem in the Real-World Connection.

Amy wants to make friendship bracelets for her 5 best friends. She has 35 beads to use. She wants each bracelet to have the same number of beads. She knows her multiplication facts and has seen 5 and 35 together. How can multiplication facts help Amy to find how many beads she should use for each bracelet?

Sample answer: Since she knows her multiplication facts, she knows that $5 \times 7 = 35$.

If 5 groups of 7 make 35, then 35 can be divided into 5 groups of 7: $35 \div 5 = 7$.

There will be 7 beads for each of the 5 bracelets.

Just as you can add numbers in any order, the Associative Property of Multiplication says that you can group numbers in any order.

TURN AND TALK

How many ways can you multiply three numbers together using the Commutative and Associative Properties?

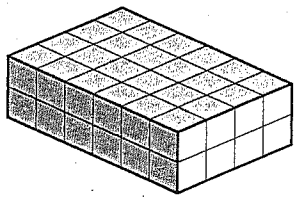
EXAMPLE

Find the product for $6 \times 4 \times 2$.

Using the Associative Property, you could try several ways:

$6 \times (4 \times 2) =$ $(6 \times 4) \times 2 =$

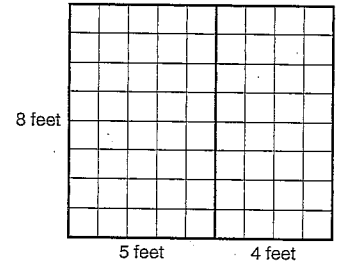
$6 \times 8 = 48$ $24 \times 2 = 48$



If you had 6 rows of 4 cubes each, and there were 2 layers of cubes, there would be $6 \times 4 \times 2$ cubes, or 48 cubes altogether.

GUIDED INSTRUCTION

There are two rectangular rooms with floors that need to be covered with tiles. The tiles are 1 foot long and 1 foot wide. One room is 8 feet wide and 5 feet long, and the other room is 8 feet wide and 4 feet long.



How could you find the number of tiles?

1. You could find 8×9, or you could use the Distributive Property and break the length of 9 feet into 5 feet and 4 feet.

   Step One Find the product of 8 and 5.

   $8 \times 5 = 40$

   Step Two Find the product of 8 and 4.

   $8 \times 4 = 32$

   Step Three Add the products.

   $40 + 32 = 72$

   The floors will need 72 tiles.

2. Use the Associative Property to show two ways to multiply 3, 4, and 5.

   Step One First way: Multiply the first two factors.

   $(3 \times 4) \times 5 =$

   12×5

   Step Two Find the total product.

   $\boxed{12} \times 5 = 60$

   Step Three Second way: Multiply the last two factors.

   $3 \times (4 \times 5) =$

   $3 \times \boxed{20} =$

   Step Four Find the total product.

   $3 \times 20 = 60$

TIPS AND TRICKS

Since you can choose the order when you multiply 3 numbers, pick the order that is easiest for you.

3. Select THREE expressions that equal 32.

   Ⓐ 3×2 Ⓑ 8×4

   Ⓒ $4 \times 8 \times 2$ Ⓓ 4×8

   Ⓔ $4 \times 4 \times 2$

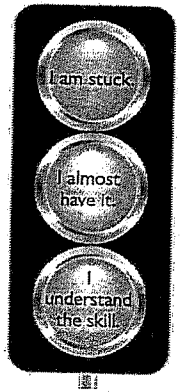
HINT, HINT

Think about multiplication facts you know with a product of 32.

TURN AND TALK

Solve this problem with help from a partner: Cora and Aidan both multiply 4 × 3 × 2. Cora multiplies 4 × 3 first and then the 2. Aidan multiplies 2 × 3 and then the 4. Who will get the answer correct? Explain your thinking.

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



How Am I Doing?

What questions do you have?

How can you use the properties to simplify multiplication problems?

Multiplication is used to find the number of square units (feet, inches, meters, miles) in a rectangle (a floor, a wall, a field). Describe a time you or your teachers have used multiplication this way.

INDEPENDENT PRACTICE

Answer the questions.

1. Which division fact can be used to find 9 × 3?

   Ⓐ 9 ÷ 3 = 3
   Ⓑ 27 ÷ 9 = 3
   Ⓒ 90 ÷ 9 = 10
   Ⓓ 90 ÷ 3 = 30

2. What is a division fact related to 9 × 6?
   Write your answer in the box.

   54 ÷ 9 = 6 or 54 ÷ 6 = 9

TIPS AND TRICKS

On a computer-based test, you will need to type your answer in the box instead of writing it in.

3. Select TWO expressions that are equal to 42.

   Ⓐ 3 × 2 × 7
   Ⓑ 7 × 7
   Ⓒ 5 × 1 × 7
   Ⓓ 6 × 7

4. What is 3 × 2 × 5?
   Write your answer in the box.

   30

5. What is 7 × 3 × 3?
   Write your answer in the box.

   63

THINK ABOUT IT

What property can you use to help you find the product?

SKETCH IT

Try sketching an array of circles or squares.

6. Which expression is equal to 8×6?

Ⓐ $(4 + 6) + (4 + 6)$
Ⓑ $(4 \times 3) + (4 \times 3)$
Ⓒ $(4 \times 6) + (4 \times 6)$
Ⓓ $(4 \times 6) + (2 \times 6)$

7. Select TWO expressions that are equal to 3×7.

Ⓐ $(3 \times 3) + (7 \times 7)$
Ⓑ $(3 \times 5) + (3 \times 2)$
Ⓒ $(7 + 3) + (7 + 3)$
Ⓓ $(7 \times 7) + (3 \times 3)$
Ⓔ $(2 \times 7) + (1 \times 7)$
Ⓕ $(2 \times 6) + (1 \times 1)$

8. Part A

What is a multiplication fact related to $28 \div 7$?

Write your answer in the box.

$4 \times 7 = 28$ or $7 \times 4 = 28$

TIPS AND TRICKS

Remember to tell how you found your answer.

Part B

Explain how you found your answer.

Sample answer: Because I know that $28 \div 7 = 4$, I know that $4 \times 7 = 28$ and $7 \times 4 = 28$. This is because these facts are part of the same fact family.

9. How could you find the product of $5 \times 8 \times 2$ if you do not remember the product of 5 and 8?

Sample answer: Use the Commutative Property to change the order of multiplication:
$5 \times 8 \times 2 = 5 \times 2 \times 8$
First, multiply 5 and 2: $5 \times 2 = 10$
Then, multiply 10 and 8: $10 \times 8 = 80$

WORK SPACE

EXIT TICKET

3.OA.5 3.OA.7

Now that you have mastered using different properties to help you multiply, let's help Tyson solve the problem in the Real-World Connection.

Tyson has collected 8 bags of treasure in his computer game. There are 7 pieces of gold in each bag. He knows he can use 8×7 to find the total amount of gold. He does not know what 8×7 equals. Tyson knows what 8×2 and 8×5 equal. How can he use those facts to find the total amount of gold?

Sample answer: There are 8 bags of gold, each with 7 pieces. Tyson can break 8×7 into two smaller products. He can add the products to find the total.

$8 \times 7 = 8 \times (2 + 5) = (8 \times 2) + (8 \times 5)$

$8 \times 2 = 16$

$8 \times 5 = 40$

$16 + 40 = 56$

So $8 \times 7 = 56$. Tyson has 56 pieces of gold.

- The Associative Property of Multiplication can be used to find a product if one factor is a multiple of 10.
  - For example, $3 \times 50 = 3 \times (5 \times 10)$ because 50 is a multiple of 10.
    $(3 \times 5) \times 10 = 15 \times 10$, or 150, or 15 tens
- Or, think about place value and use place-value blocks to show groups of 10.
  - For example, 3×50 is 3 groups of 50, 50 is 5 tens, so there are 3×5 tens, or 15 tens, or 150.

SKETCH IT

In the space below draw three squares, each with four circles inside it, to represent 3×40. Each circle represents a ten.

TURN AND TALK

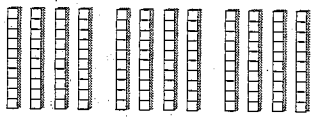
Can you use the Associative Property to show that 3×40 and 4×30 will have the same product?

EXAMPLE

4 of the months in the year have 30 days. How many days are in those 4 months? Find the value of 3×40.

Use place-value blocks to show 3 groups of 40.

This is the same as 3 groups of 4 tens.



There are 3 groups of 4 tens, or 3×4 tens.

$3 \times 4 = 12$, so there are 12 tens.

12 tens is 120.

So, $3 \times 40 = 120$.

You can also use the Associative Property to multiply by a multiple of 10.

EXAMPLE

What is 8×20?

20 is a multiple of 10: $2 \times 10 = 20$

So, $8 \times 20 = 8 \times (2 \times 10)$.

Since we can multiply in any order, we can multiply 8×2 first:

$(8 \times 2) \times 10 =$

$16 \times 10 = 160$

So, $8 \times 20 = 160$.

GUIDED INSTRUCTION

Many items come in multiples of 10 because it is easy to keep track of the total amount. If a box holds 40 pencils and you have 7 boxes, how many pencils do you have?

1. Evaluate the expression 7×40 to find the number of pencils.

Step One Write an expression with 10 as a factor.

$7 \times (4 \times 10)$

Step Two Use the Associative Property to rewrite the expression.

$(7 \times 4) \times 10$

Step Three Use a multiplication fact.

28 $\times 10$

Step Four Find the product and answer.

$28 \times 10 =$ 280

There are 280 pencils.

TIPS AND TRICKS

There are several ways to think about these problems. Use the method that works best for you.

2. Evaluate the expression: 6×30

Step One Just as you can skip-count by 3s, you can skip-count by 30, six times.

30, 60, 90, 120, 150, 180

THINK ABOUT IT

Use estimation to help you. Since $6 \times 3 = 18$, you know that 6×30 will be greater than 18.

Step Two Find the product.

$6 \times 30 = 180$

3. Find the value of the expression: 4×60

Step One Rewrite 60 using place value.

60 = 6 tens

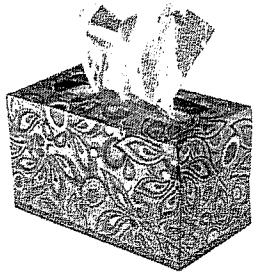
Step Two Use a multiplication fact.

4 × 6 tens = 24 tens

Step Three Find the product.

$4 \times 60 =$ 240

4. There are 9 boxes. There are 80 tissues in each box. How many tissues are there in all?



Step One Write a multiplication expression to represent the number of tissues.

9×80

Step Two Rewrite the expression with 10 as a factor.

$9 \times (8 \times 10)$

Step Three Use the Associative Property to rewrite the expression.

$(9 \times 8) \times 10$

Step Four Use a multiplication fact.

$72 \times$ 10

Step Five Find the product and answer.

$9 \times 80 = 720$

There are 720 tissues in all.

5. There are 6 third-grade classes. Each class has 20 students. Select TWO expressions that show a strategy that can be used to find the total number of students.

HINT, HINT

There are 6 groups of 20. Which expressions are equivalent to 6×20?

Ⓐ $6 + 20$

Ⓑ $6 \times (2 + 10)$

Ⓒ 60, 120, 180, 240, 300, 360

Ⓓ $6 \times (2 \times 10)$

Ⓔ 6×2 tens

TURN AND TALK

Work with a partner to solve this equation: Eliza can text 50 words in a minute. Jonathan can text 60 words in a minute. How many more words can Jonathan text than Eliza in 7 minutes? Explain.

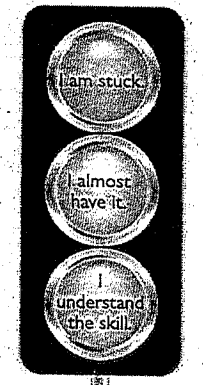
How Am I Doing?

What questions do you have?

Show how you could use more than one strategy to multiply by a multiple of 10.

Describe an example where you would multiply by a multiple of 10.

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



INDEPENDENT PRACTICE

Answer the questions.

1. Dance classes cost $60 per month. Classes are 8 months long. How much does it cost to take a dance class?

   (A) $68
   (B) $140
   (C) $420
   (D) $480

2. Amanda buys 4 packages of notebook paper. Each package has 90 sheets. Select TWO expressions that show a strategy that can be used to find how many sheets of paper there are in all.

   (A) $(4 \times 90) \times 10$
   (B) $(4 \times 9) + 10$
   (C) 40, 80, 120, 160
   (D) 90, 180, 270, 360
   (E) 4×9 tens
   (F) 4 tens $\times$ 9 tens

TIPS AND TRICKS

The problem is about equal groups. Identify the number of groups and the number in each group. Cross out the answer choices that are not reasonable.

3. There are 7 trays on a rack. Each tray holds 60 fruit cups. Select TWO expressions that can be used to find how many fruit cups there are in all.

   (A) $(7 + 60) \times 10$
   (B) $(7 \times 6) \times 10$
   (C) 13×10
   (D) 42×10

THINK ABOUT IT

Think about the factors in the problem. How can you use what you know about multiples of 10 to solve the problem?

WORK SPACE

4. The students in Declan's class read 20 minutes each night as part of their homework. How many minutes has each student read after 7 days?

   Write your answer in the box.

   140 minutes

5. What number belongs in the box to make an expression equal to 6 × 50?

   $(6 \times \square) \times 10$

   Ⓐ 2
   Ⓑ 5
   Ⓒ 6
   Ⓓ 10

6. Which problem can be solved with the expression 8 × 40?

   Ⓐ 8 students each brought in packages of 40 cups. How many cups were brought in altogether?
   Ⓑ There are 8 students and 40 cups. How many more cups are there than students?
   Ⓒ There are 40 students in the class, but 8 are absent today. How many students are not absent?
   Ⓓ There are 40 students split evenly into 8 teams. How many students are on each team?

7. Part A

   Gianna practices piano for 40 minutes each day for 5 days. How many minutes does she practice piano in all?

   Write your answer in the box.

   200 minutes

Part B

Describe the strategy you used to find your answer.

Sample answer: I skip-counted by 40 five times: 40, 80, 120, 160, 200.

WORK SPACE

8. Part A

   A math textbook has 9 chapters. There are 30 pages in each chapter. How many pages are in the book?

   Ⓐ 90
   Ⓑ 93
   Ⓒ 120
   Ⓓ 270

Part B

Describe the strategy you used to find your answer.

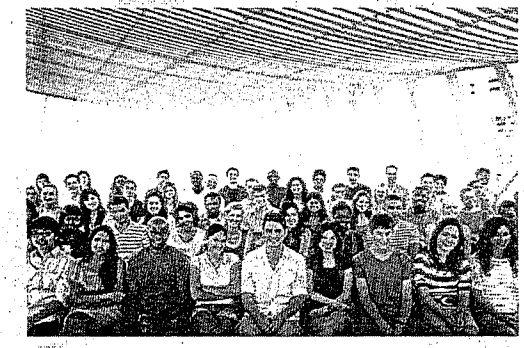
Sample answer: I used a multiplication fact. 9 times 3 tens is 27 tens, and 27 tens is 270.

EXIT TICKET

3.NBT.3

Now that you have mastered multiplying by a multiple of 10, let's solve the problem in the Real-World Connection.

The students at the talent show are performing in front of a "full house." This means every seat in the auditorium is filled. There are 5 sections in the auditorium, and each section has 50 seats. How many people are watching the show?



250 people are watching the show.

2. An orchard has 48 apples trees. The trees are planted in 6 equal rows. How many trees are in each row?

Step One Read the problem. What do you know?

The problem is about equal groups.

The total is [48] and the number of groups is [6].

Step Two Decide what operation to use.

I need to find the total number of trees in each group, so I will use division.

Step Three Choose a strategy to solve the problem.

I can use a fact family:

$6 \times 8 = 48$ $48 \div 6 = 8$

$8 \times 6 = 48$ $48 \div 8 = 6$

Step Four Solve the problem.

$48 \div 6 =$ [8]

There are [8] trees in each row.

TURN AND TALK

Which multiplication fact is related to the division fact?

3. Sia is making hair bows for her friends.

She needs 2 feet of ribbon for each bow.

Sia has 18 feet of ribbon. How many bows can Sia make?

Write the correct number in each box. Then write the solution.

$2 \times$ [9] $=$ [18]

[18] $\div 2 =$ [9]

Sia can make [9] bows.

How Am I Doing?

What questions do you have?

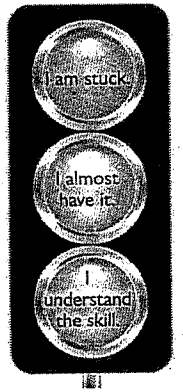
Which strategy for solving multiplication and division problems is your favorite, and why?

Describe situations where arrays are used, or where you have seen an array.

SKETCH IT

In the space below, draw an array and write a multiplication sentence that solves this problem: Alexis has 3 baskets of oranges. Each basket has 8 oranges in it. How many oranges are in the baskets?

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

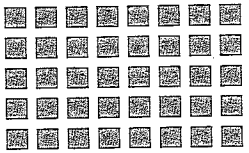


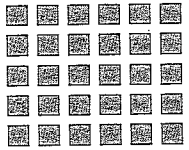
WORK SPACE

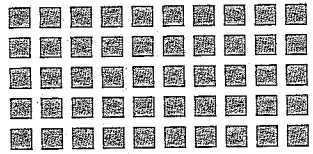
INDEPENDENT PRACTICE

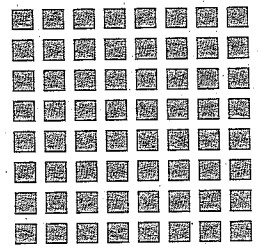
Answer the questions.

1. Kiley has 40 blocks. She made a stack of 5 rows. Then she put an equal number of blocks in each row. Which array shows how many blocks are in each row?

Ⓐ 

Ⓑ 

Ⓒ 

Ⓓ 

2. There are 24 markers in a package. The markers are divided equally and given to 3 friends. How many markers does each friend get?

   Select THREE related facts that can be used to solve the problem.

   Ⓐ $24 \div 8 = 3$
   Ⓑ $24 \div 6 = 4$
   Ⓒ $8 \times 3 = 24$
   Ⓓ $6 \times 4 = 24$
   Ⓔ $3 \times 8 = 24$

3. Four friends are playing a game. 36 cards are dealt out between the friends. Select TWO equations that can be used to find how many cards each person receives.

   Ⓐ $144 \div 36 = 4$
   Ⓑ $36 \div 4 = 9$
   Ⓒ $4 \times 9 = 36$
   Ⓓ $36 \times 4 = 144$
   Ⓔ $36 \div 9 = 4$

4. The Explorers Club is camping. There are 4 tents. Each tent has 5 campers. What is an equation you could use to find the total number of campers?

   Write your equation in the box. Use a box to stand for the unknown number.

$4 \times 5 = \square$

TIPS AND TRICKS

Highlight the important information. An example might be the number of groups or the total number of markers. Be sure that the answers you select contain the information.

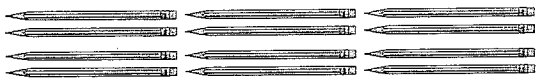
WORK SPACE

WORK SPACE

5. Maria gets a magazine every 3 months. How many magazines does Maria get each year?

Ⓐ 12
Ⓑ 9
Ⓒ 6
Ⓓ 4

6. A pencil box holds 12 pencils. Each child is given 2 pencils. How many children are given pencils?



Part A

Write an equation you can use to solve the problem.

$12 \div 2 = 6$

Part B

How many children are given pencils?

Sample answer: Six children are given pencils.

Part C

How many children will get pencils if each child is given 3 pencils? Explain how you found your answer.

Sample answer: Four children get pencils. I used the equation $3 \times \square = 12$. I knew that $3 \times 4 = 12$.

7. Select THREE situations that can be solved with the equation $6 \times 7 = 42$.

Ⓐ 7 students are sitting on each row of bleachers. There are 6 rows of bleachers. How many students are sitting on the bleachers?

Ⓑ 7 children got to soccer practice on time. 6 children were late. How many children are at practice?

Ⓒ 42 apples are placed in bags. There are 6 apples in each bag. How many bags of apples are there?

Ⓓ There are 6 minivans. Each minivan holds 7 people. How many people can ride in the minivans in all?

Ⓔ 6 friends want to play kickball. 7 others want to play soccer. How many more people want to play soccer than kickball?

HINT, HINT

In the equation, which number is the total? Which numbers are the number of groups or number of objects? How does this help you decide which problems can be solved with the equation?

WORK SPACE

EXIT TICKET

3.OA.3

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

The third-grade students are having a science fair. There are 27 students in Ms. Scott's third-grade class. Ms. Scott puts the students into groups of 3 to complete their projects for the science fair. How many groups will Ms. Scott have? Write the multiplication fact you can use to solve the problem, and then write the solution.

Sample response: I can use the multiplication fact $9 \times 3 = 27$. This shows that $27 \div 3 = 9$. There will be 9 groups.

PRACTICE TEST

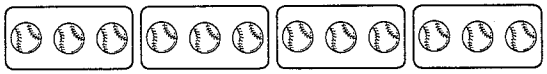
Answer the questions.

1. Jessie has 14 rocks and 2 bags. She wants to place an equal number of rocks in each bag. How many rocks should Jessie put in each bag?

   Write your answer in the box.

   [7] rocks

2. Select THREE number sentences that describe the drawing.



   - (A) 3 groups of 4
   - (B) 4 + 4 + 4 + 4
   - (C) 4 × 3
   - (D) 4 groups of 3
   - (E) 4 × 4
   - (F) 3 + 3 + 3 + 3

3. Tom says he can write a multiplication sentence for 3 + 4 + 5. Does Tom's statement make sense? Explain your answer.

   Sample answer: No, it does not make sense. To multiply, you need equal groups. There are not equal groups in 3 + 4 + 5.

4. A librarian places 21 books in equal stacks. How many books could be in each stack?
Select TWO correct answers.

Ⓐ 2 books
Ⓑ 3 books
Ⓒ 4 books
Ⓓ 5 books
Ⓔ 6 books
Ⓕ 7 books

5. Write the numbers that correctly complete the table.

Counters	Number of Equal Groups	Number in Each Group
30	5	6
24	8	3
16	4	4

6. Select TWO expressions that are equal to 7×9.

Ⓐ $(7 \times 3) + (7 \times 3)$
Ⓑ $(5 \times 9) + (2 \times 9)$
Ⓒ $(7 + 3) + (7 + 3)$
Ⓓ $(7 \times 7) + (3 \times 3)$
Ⓔ $(7 \times 8) + (7 \times 1)$
Ⓕ $(5 \times 6) + (2 \times 3)$

7. Write the number in the box that correctly completes each multiplication and division equation.

$81 \div \boxed{9} = 9$
$\boxed{3} \times 6 = 18$
$63 \div \boxed{7} = 9$
$6 \times \boxed{9} = 54$
$36 \div \boxed{6} = 6$
$5 \times \boxed{6} = 30$

8. Maria has 24 hair ribbons. She wants to share them evenly among her 4 sisters. She knows she needs to divide 24 by 4. Complete the equation that Maria can use to find the answer.

Fill in the blank.

$4 \times \boxed{6} = 24$

9. Part A
Which number makes the expression below equal to 5×8?

$(5 \times 2) + (5 \times \square)$

Ⓐ 4
Ⓑ 6
Ⓒ 3
Ⓓ 5

Part B

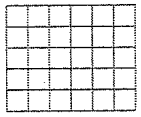
Explain how you found your answer to Part A.

Sample answer: When multiplying, I can break numbers apart. The answer is 6 because 2 + 6 = 8. Instead of multiplying 5 by 8, I can multiply 5 by two numbers that equal 8. Because 5 × 2 is shown, I know the other partial product is 5 × 6.

10. The desks in a classroom are arranged in groups of 5. There are 6 desks in each group. How many desks are in the classroom?

Part A

Draw an array that represents how many desks are in the classroom.



Part B

Write an equation to show how you found your answer.

Sample answer: There are 30 desks. 6 × 5 = 30

Part C

Two more desks are added to the classroom. Now the desks are arranged in groups of 4. How many groups of desks are there? Explain how you found your answer.

Sample answer: There are 32 desks because 30 + 2 = 32. Because 32 ÷ 4 = 8, there are 8 groups of desks.

11. Find the quotient that makes the division sentence true.

35 ÷ 7 = 5

12. Select TWO number sentences that show 5 groups of 3.

- (A) 5 + 3
- (B) 3 + 3 + 3 + 3 + 3
- (C) 5 × 3
- (D) 5 + 5 + 5
- (E) 3 + 3 + 3 + 5

13. The art teacher cut 6-inch pieces of yarn for a project. She cut 30 pieces of yarn. Select TWO expressions that show strategies that could be used to find how many total inches of yarn the art teacher used.

- (A) (6 × 30) × 10
- (B) (6 + 3) × 10
- (C) (6 × 3) × 10
- (D) 30, 60, 90
- (E) 18 groups of 3 tens
- (F) 6 groups of 3 tens

14. Part A

Mark solves 20 math problems each day for 6 days. How many math problems does he solve in all?

Sample answer: Mark solves 120 math problems.

Part B

Describe the strategy you used to find your answer.

Sample answer: I skip-counted by 20 six times: 20, 40, 60, 80, 100, 120.

So, 351 rounds down to 350

SKETCH IT

In the margin draw a number line to find which of the numbers below rounds to 300 when rounded to the nearest hundred.
342, 396, 309, 375, 297

3.

Round $722 to the nearest hundred dollars.

Look at the digit in the tens place. The digit is 2.
Any digit 4 or lower rounds down.

So, 722 rounds down to 700

HINT, HINT

The tens digit plays an important role when rounding to the nearest hundred. Remember, if the tens digit is 5 or more, increase the hundreds digit by 1 and write a 0 in the ones and tens place.

4. When rounded to the nearest hundred, which numbers round to 300? Select THREE correct answers.

Ⓐ 342
Ⓑ 396
Ⓒ 309
Ⓓ 375
Ⓔ 297

How Am I Doing?

What questions do you have?

Think about your house or apartment number. Can you round that number to the nearest ten and the nearest hundred? Explain your answer.

What is an example of a time when you would only need an estimate and not an exact answer? What are some words that indicate an estimate?

TURN AND TALK

With the help of a partner, answer the following: Kenan is thinking of a number with 3 digits. When he rounds his number to the nearest hundred, it is 600. What is the number he could be thinking of? Explain.

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

WORK SPACE

INDEPENDENT PRACTICE

Answer the questions.

1. What is 643 rounded to the nearest ten?

   Ⓐ 600
   Ⓑ 640
   Ⓒ 643
   Ⓓ 650

2. There are 372 seats in the auditorium.

   To the nearest hundred, about how many seats are in the auditorium?

   Ⓐ 300
   Ⓑ 370
   Ⓒ 380
   Ⓓ 400

3. What is 833 rounded to the nearest hundred?

   Ⓐ 830
   Ⓑ 840
   Ⓒ 800
   Ⓓ 900

4. Which number rounds to 40 when rounded to the nearest ten?

   Ⓐ 35
   Ⓑ 34
   Ⓒ 47
   Ⓓ 45

5. Select TWO numbers that round to 600 when rounded to the nearest hundred.

   Ⓐ 498
   Ⓑ 605
   Ⓒ 661
   Ⓓ 630
   Ⓔ 697

6. Select THREE numbers that would round up to the nearest ten and round up to the nearest hundred.

   Ⓐ 889
   Ⓑ 905
   Ⓒ 376
   Ⓓ 949
   Ⓔ 165

7. To raise money for a school trip, Ricardo's class is selling raffle tickets. During the first week, they sold 253 raffle tickets. During the second week, they sold 389 raffle tickets.

   Which expression will give the best estimate for the total number of tickets Ricardo's class sold?

   Ⓐ 250 + 380
   Ⓑ 250 + 390
   Ⓒ 260 + 390
   Ⓓ 260 + 400

HINT, HINT

To round to the nearest hundred, look at the digit in the tens place.

WORK SPACE

▶ THINK ABOUT IT

Explain the reasoning you used to get your answer.

WORK SPACE

8. Part A

Round 647 to the nearest ten. Write your answer in the box.

650

Part B

Explain how you rounded 647 to the nearest ten.

Sample answer: I looked at the 7 in the ones place, and since 7 is greater than 5, I rounded up to the next 10 and got 650.

9. Part A

Thomas says that 448 rounded to the nearest hundred is 500, because 48 is closer to 50 than to 40, and 450 is closer to 500 than to 400. Thomas is incorrect. Explain how to correctly round 448 to the nearest hundred.

Sample answer: When rounding to the nearest hundred I look at the number in the tens place, and it is 4. Since 4 is less than 5, the number gets rounded down to the lower hundred, so this would round down to 400.

Part B

Select all of the numbers that would round to 500 when rounded to the nearest hundred.

Ⓐ 531

Ⓑ 435

Ⓒ 440

Ⓓ 474

EXIT TICKET

3.NBT.1

Now that you have mastered estimating values by rounding to the nearest ten and nearest hundred, let's solve the problem in the Real-World Connection.

The city zoo has new penguins. On Saturday, 227 people came to see the penguins. On Sunday, 362 people came to see the penguins. About how many people visited each day? Round to the nearest ten and the nearest hundred.

Look at the number 227.

What is 227 rounded to the nearest ten? 230

What is 227 rounded to the nearest hundred? 200

Look at the number 362.

What is 362 rounded to the nearest ten? 360

What is 362 rounded to the nearest hundred? 400

Rounding to which place gives a closer estimate of the number of people that came to see the penguins each day? Explain your answer.

Rounding to the tens place gives a closer estimate. The rounded value is closer to the exact value.

TURN AND TALK

Think about the two strategies. When might the break apart strategy work better than the count up strategy?

EXAMPLE

Break Apart Strategy

Break apart to add.	Break apart to subtract.
258 + 327	369 − 132
200 + 50 + 8 + 300 + 20 + 7 500 + 70 + 15	300 + 60 + 9 − 100 − 30 − 2 200 + 30 + 7
Break apart the addends. Add each place value.	Subtract the hundreds. Subtract the tens. Subtract the ones.
Add the sums. 500 + 70 + 15 = 585, so 258 + 327 = 585.	Add the differences. 200 + 30 + 7 = 237, so 369 − 132 = 237.

You can use place value to add and subtract.

EXAMPLE

Place Value

Add. 286 + 635

Add the ones.
6 + 5 = 11, so regroup 10 ones as 1 ten.

Add the tens.
1 + 8 + 3 = 12, so regroup 10 tens as 1 hundred.

Add the hundreds.
1 + 2 + 6 = 9

$$\begin{array}{r} {\scriptstyle 1\,1} \\ 286 \\ +\ 635 \\ \hline 921 \end{array}$$

Subtract. 317 − 109

Subtract the ones.
7 < 9, so regroup 1 ten as 10 ones.
Subtract the 9 from 17 ones.
17 − 9 = 8

Subtract the tens.
0 − 0 = 0

Subtract the hundreds.
3 − 1 = 2

$$\begin{array}{r} {\scriptstyle 0\,17} \\ 3\not{1}\not{7} \\ -\ 109 \\ \hline 208 \end{array}$$

GUIDED INSTRUCTION

1. During the first week of the summer, the concession stand at the waterpark sold 156 ice cream cones and 257 popsicles. How many total treats were sold? How many more popsicles were sold than ice cream cones?

Add to find the total number of treats sold.
You can use the break apart strategy.

Step One Break apart the addends.

100 + 50 + 6 + 200 + 50 + 7

Step Two Add the hundreds.

100 + 200 = 300

Step Three Add the tens.

50 + 50 = 100

Step Four Add the ones.

6 + 7 = 13

Step Five Add the sums.

300 + 100 + 13 = 413

There were 413 treats sold in all.

Subtract to find how many more popsicles were sold than ice cream cones. Find 257 − 156.

You can use the place-value strategy.

Step One Subtract the ones.

7 − 6 = 1

Step Two Subtract the tens.

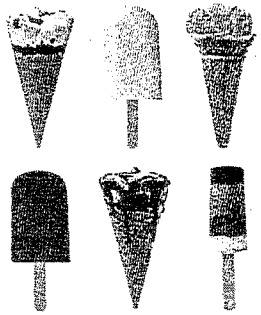
5 − 5 = 0

Step Three Subtract the hundreds.

2 − 1 = 1

TIPS AND TRICKS

This is just one strategy for finding the sum. Try using place value or another strategy.



Step Four Enter the answers in the boxes below.

$$\begin{array}{r} 257 \\ -\ 156 \\ \hline 101 \end{array}$$

There were 101 more popsicles sold than ice cream cones.

HINT, HINT

Subtract the hundreds, then the tens, and finally the ones.

2. Part A

Solve 434 − 121 using the break-apart strategy.

400 − 100 = 300

30 − 20 = 10

4 − 1 = 3

TIPS AND TRICKS

This is the second part of the question. Look back at the work you completed in Part A. Add the differences of the hundreds, tens, and ones. Record the sum. This is the difference of 434 and 121.

Part B

Find the difference. Write your answer in the box.

434 − 121 = 313

How Am I Doing?

What questions do you have?

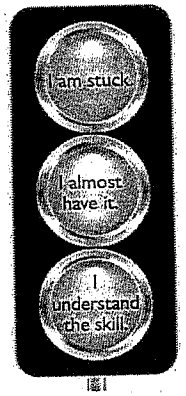
Write down three numbers between 0 and 1,000. Show two ways to find the sum.

What are some strategies you can use to add or subtract? Make a list and tell when you would choose to use each. Give examples to support your answers.

TURN AND TALK

With a partner, answer the following: Owen swims for 30 minutes in the morning and for 37 minutes in the afternoon. Choose a method and use it to find out how many minutes he swam in all. Explain why you chose the method.

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



INDEPENDENT PRACTICE

Answer the questions.

1. Solve.

   $82 + 49 = \square$

   Ⓐ 33 Ⓑ 121
   Ⓒ 127 Ⓓ 131

TIPS AND TRICKS

Think about the answer choices in question 1. Do any not make sense as the sum of 82 and 49? If so, you can cross that answer choice out.

2. Pete has 197 beads. He gives 39 away. How many beads does Pete have remaining?

   Write your answer in the box.

   158 beads

3. Think about the problem 530 + 156.
   Use the break-apart strategy to solve. Complete the chart to show each step in order from 1–4.

Step	Order
0 + 6 = 6	3
600 + 80 + 6 = 686	4
30 + 50 = 80	2
500 + 100 = 600	1

4. Write the number that correctly completes the subtraction equation.

   427 − 199 = 228

HINT, HINT

The total is 573. You know one addend is 219. What number added to 219 is 573?
Use subtraction to help you.

5. Write the addend that correctly completes the equation.

   219 + 354 = 573

6. There are 518 books in the library. There are 327 fiction books. How many books are NOT fiction?

   Ⓐ 111
   Ⓑ 191
   Ⓒ 211
   Ⓓ 845

7. Vale finds the value of the expression 12 + 29 + 188.
   She used the Commutative Property of Addition in her first step and the Associative Property of Addition in her second step.

   Part A

   Show the steps that Vale could have used to find the value of the expression. Be sure to label each property in your work shown.

   Sample answer:

   12 + 29 + 188 = 12 + 188 + 29: Commutative
   = (12 + 188) + 29: Associative
   = 200 + 29
   = 229

   Part B

   Show another strategy that can be used to solve Vale's problem. Name the strategy you used.

   Sample answer: I used place value to add.

   11
   12
   29
   + 188
   229

WORK SPACE

EXIT TICKET

Now that you have mastered using different strategies to add and subtract, let's solve the problem in the Real-World Connection.

A movie theater has three showtimes. The theater sells tickets to 120 people for the first show, 162 people for the second show and 180 people for the third show. The movie theater has 247 seats. How many people see the movie in all? How many seats are empty at the third show?

Add and subtract to find the answers.

Add the number of people at each show to find the total number of people who seethe movie.

120 + 162 + 180 = 462

Subtract the number of people at the third show from the total number of seats to find the number of empty seats. Use place value to subtract. Regroup when necessary.

$$\begin{array}{r} 247 \\ -\ 180 \\ \hline 67 \end{array}$$

Step Four Use estimation to decide if your answer is reasonable.

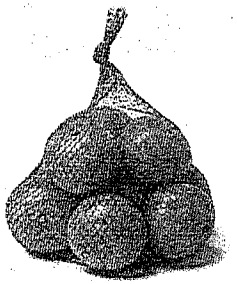
Look at the original equation: $16 + 16 \times 2 = x$.

Round up the 16 in the multiplication step to 20.

You know that $20 \times 2 = 40$, and $40 + 16 = 56$.

So, 48 is a reasonable answer because it is close to 56.

GUIDED INSTRUCTION



TURN AND TALK

What would you do if your answer was not reasonable after checking with estimation?

1. Brittany brought oranges as a snack for her class. She brought 3 bags of oranges. Each bag contains 12 oranges. She also brought 6 more oranges to make sure she had plenty of oranges for everyone in the class. How many oranges did she bring to class?

Step One Use a letter, x, to represent the number you are trying to find: the number of oranges she brought to class.

number of bags ↓ extra oranges ↓

$3 \times 12 + 6 = x$

↑ oranges in each bag

Step Two Write the equation.

Look for words in the problem to help you decide which operations to use.

Step Three Use the Order of Operations to solve the equation.

Multiply first. Then add.

$3 \times 12 + 6 = x$

$36 + 6 = x$

$42 = x$

Brittany brought [42] oranges to class.

Step Four Check your answer. Is it reasonable?

Round 12 down to 10.

Then multiply and add.

$3 \times 10 = 30$ and $30 + 6 = 36$

So, 36 is a reasonable answer because it is close to 42.

2. One-fourth of Sidney's karate class has blonde hair. There are 28 children in Sidney's class. Four adults with blonde hair join the class. What is the total number of people in the class that have blonde hair?

THINK ABOUT IT

What does x represent? Write it down.

Write the equation.

[28] ÷ 4 + [4] = x

Use the Order of Operations to solve the equation.

[7] + [4] = x

[11] = x

A total of [11] people in the class have blonde hair.

3. Which equation can be used to solve this word problem?

Arianne has 4 packages of stickers. Each package has 6 stickers. She gives 3 stickers to her friend. How many stickers does Arianne have left?

Ⓐ $4 + 6 - 3 = x$

Ⓑ $4 \times 3 - 6 = x$

Ⓒ $4 \times 6 - 3 = x$

Ⓓ $4 + 3 \times 6 = x$

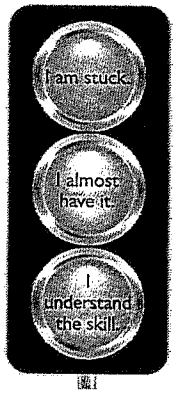
HINT, HINT

Use the letter x to represent the number you are trying to find: the number of stickers Arianne has left. Look for words in the problem to help you decide which operations to use.

TURN AND TALK

Solve the following with help from a partner: Sebastian had $20. He spent $6 on lunch. He wants to buy 3 games that each cost $5. Does he have enough money to buy the games? Explain your answer.

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



How Am I Doing?

What questions do you have?

What are some words in a word problem that would indicate that you would need two or more steps, or operations, to answer? Write down as many words as you can think of.

Write an equation with more than one operation. How do you use the Order of Operations to solve it?

INDEPENDENT PRACTICE

Answer the questions.

1. Which equation can be used to solve this problem?

   There were 20 goldfish in a tank at the pet store. There were twice as many tropical fish in the next tank. How many total fish were there in the two tanks?

   (A) $20 + 2 \times 20 = x$
   (B) $20 \times 2 \times 20 = x$
   (C) $20 + 2 + 20 = x$
   (D) $20 + 2 - 20 = x$

2. Look at equations A, B, and C.

   A: $9 \times 3 - 2 = x$
   B: $2 + 7 \times 3 = x$
   C: $4 \div 14 - 3 = x$

   Compare the values of x in each equation in the boxes.

   C < B < A

3. Look at each equation and the student's answer. Which equation did the student solve correctly using the Order of Operations?

   (A) $100 \div 4 - 15 = x$
   $x = 10$

   (B) $12 \times 6 + 24 = x$
   $x = 360$

   (C) $24 - 8 \times 2 = x$
   $x = 32$

   (D) $72 \div 9 + 10 = x$
   $x = 15$

TIPS AND TRICKS

You may want to write the equation without looking at the answer choices first and see if yours matches any of the choices.

WORK SPACE

4. Jennifer counted all the cars in the school parking lot. She counted 29 cars parked in the lot. Five people drove out of the parking lot. After that, 16 more cars drove into the lot. How many cars are there now?

Write numbers in the boxes to make a true equation.

29 − 5 + 16 = 40

HINT, HINT

Remember to create an equation before you try to solve the problem.

5. Part A

Solve the word problem.

Miguel had 10 markers. Seth had 4 times as many markers as Miguel. How many markers did they have altogether?

Write your answer in the box.

50 markers

Part B

Name the operation you needed to perform first in the word problem. Explain how you know.

Sample answer: I had to perform multiplication first. The Order of Operations tells me to multiply before adding.

HINT, HINT

If they found 15 kinds of insects that were the same, they should only be counted 1 time.

6. Part A

Kenny and Chelsea were counting how many kinds of insects they could find. Kenny found 32 kinds of insects. Chelsea found 27 kinds of insects. However, they realized that they found 15 of the same kinds of insects. How many kinds of insects did they find in all?

Write out your equation and solve it.

$A = 32 + 27 - 15$

$A = 59 - 15$

$A = 44$

Part B

Explain how you can use rounding to check your answer.

Sample answer: You can round the number of kinds of insects Kenny found to 30. Then, round the number of kinds of insects Chelsea found to 30. Add those two numbers together and then subtract 15 to get 45.

WORK SPACE

7. Deanna uses the equation $20 + 20 \times 2 = x$ to solve the following word problem:

Melissa took her dog on two walks today. She walked her dog for 20 minutes in the morning. In the afternoon, she walked her dog for half the amount of time she walked her dog in the morning.

Deanna's equation is incorrect.

- How many total minutes did Melissa spend walking her dog today?
  Be sure to include the equation you used to solve the problem.
- Show all your work.

Sample answer: Melissa walked her dog for 30 minutes today.
number of minutes in morning: 20
number of minutes in afternoon: half of 20 = 10
total number of minutes: 20 + 10 = 30

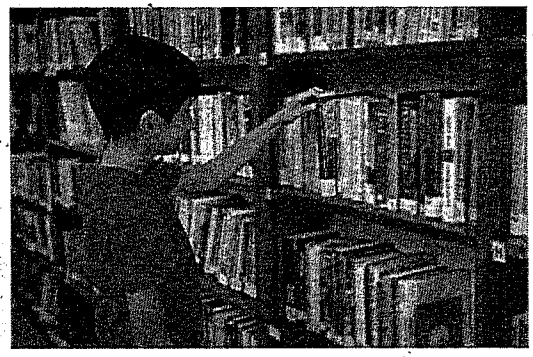
EXIT TICKET

3.OA.8

Now that you have mastered solving two-step word problems by writing an equation and using the Order of Operations, let's solve the problem in the Real-World Connection.

Sam's class gives 45 new books to the school library. Juan's class gives 30 new books to the school library. Mr. Jallaq, the school librarian, gives 20 of the new books received by the school library to the local children's hospital. How many new books remain at the school library? Write and solve an equation.

$45 + 30 - 20 = x$; The library has 55 new books.



Hint, Five The highlighted numbers are products with a factor of 5. What do you notice about the ones places of the products?

The product of 5 and any number always ends in 0 or 5.

HINT, HINT

Think about the properties of addition and look for patterns.

2. Select THREE statements that are true about the highlighted numbers in the hundred chart.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Ⓐ The highlighted numbers show skip-counting by 4.

Ⓑ Any even number plus 4 is odd.

Ⓒ The table lists multiples of 4.

Ⓓ All the numbers end in 0 or 4.

Ⓔ The rule for the pattern is "add 4."

How Am I Doing?

What questions do you have?

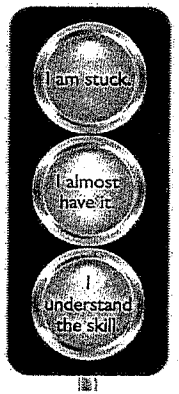
What is one pattern in the numbers on your ruler?

How can you apply the Commutative Property to your morning routine? Does it matter in what order you eat your breakfast, get dressed, and brush your teeth?

TURN AND TALK

Solve the following with help from a partner: For every 1 cup of orange juice, Lila adds 4 cups of ginger ale to make punch. How many cups of ginger ale will she add if she has 3 cups of orange juice? Explain the rule you used.

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



INDEPENDENT PRACTICE

Answer the questions.

HINT, HINT

A pattern follows the rule for every number in the series.

1. Which rule shows the pattern that is highlighted on the hundred chart?

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Ⓐ "add 6"
Ⓑ "add 3"
Ⓒ "multiply by 6"
Ⓓ "multiply by 3"

HINT, HINT

Write an equation to show how to get from the first number to the second number. Do this for every pair of numbers in the series.

2. Which is the rule for the series?

7, 12, 17, 22, 27 . . .

Ⓐ "add 5"
Ⓑ "add 7"
Ⓒ "multiply by 5"
Ⓓ "multiply by 10"

3. What is the rule for the series?

3, 6, 12, 24, 48 . . .

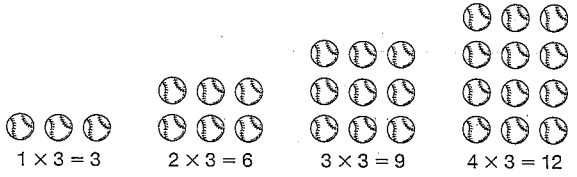
Write your answer in the box.

multiply by 2

4. Write a number in each box to complete the pattern.

65, 70, 75, 80, 85, 90, 95

5. Geoff made arrays using baseballs. He wrote an equation for each array.



Which statement is NOT correct?

Ⓐ 3 times an even number equals an even number.
Ⓑ 3 times an odd number equals an odd number.
Ⓒ The rule for the series 3, 6, 9, 12 . . ., is "multiply by 3."
Ⓓ 3, 6, 9, and 12 are multiples of 3.

WORK SPACE

WORK SPACE

6. Look at the addition table.

+	1	2	3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10	11
2	3	4	5	6	7	8	9	10	11	12
3	4	5	6	7	8	9	10	11	12	13
4	5	6	7	8	9	10	11	12	13	14
5	6	7	8	9	10	11	12	13	14	15
6	7	8	9	10	11	12	13	14	15	16
7	8	9	10	11	12	13	14	15	16	17
8	9	10	11	12	13	14	15	16	17	18
9	10	11	12	13	14	15	16	17	18	19
10	11	12	13	14	15	16	17	18	19	20

Write a number in each box to correctly complete the chart.

addend	addend	sum
3	3	6
5	3	8
6	3	9
9	3	12
10	3	13

7. Part A

Write the equation in the box that each multiplication table shows.

WORK SPACE

×	0	1	2	3	4	5	6	7	8
0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8
2	0	2	4	6	8	10	12	14	16
3	0	3	6	9	12	15	18	21	24
4	0	4	8	12	16	20	24	28	32
5	0	5	10	15	20	25	30	35	40
6	0	6	12	18	24	30	36	42	48
7	0	7	14	21	28	35	42	49	56
8	0	8	16	24	32	40	48	56	64

$7 \times 6 = 42$

×	0	1	2	3	4	5	6	7	8
0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8
2	0	2	4	6	8	10	12	14	16
3	0	3	6	9	12	15	18	21	24
4	0	4	8	12	16	20	24	28	32
5	0	5	10	15	20	25	30	35	40
6	0	6	12	18	24	30	36	42	48
7	0	7	14	21	28	35	42	49	56
8	0	8	16	24	32	40	48	56	64

$6 \times 7 = 42$

Part B

Explain what the equations in Part A tell you.

Sample answer: The products are equal. This means that factors can be multiplied in any order and the product will not change.

TIPS AND TRICKS

In this question, you are writing your answer on lines. In questions like these, there can be more than one correct answer.

EXIT TICKET

3.OA.9

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

Oliver receives $5 each week for finishing his chores. He saves his money for 3 weeks. How can he use a multiplication table to find the amount of money he saved? Identify the factors and solve the problem. How much money has Oliver saved?

×	0	1	2	3	4	5	6
0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6
2	0	2	4	6	8	10	12
3	0	3	6	9	12	15	18
4	0	4	8	12	16	20	24
5	0	5	10	15	20	25	30
6	0	6	12	18	24	30	36

The factors are 5 and 3. The table shows $5 \times 3 = 15$ or $3 \times 5 = 15$.

Oliver has saved $15.

PRACTICE TEST

Answer the questions.

1. Which number will round to 400 when rounded to the nearest hundred?

   Ⓐ 491
   Ⓑ 345
   Ⓒ 455
   Ⓓ 378

2. Write the number that correctly completes the statement.

   The number 63 rounded to the nearest 10 is [60].

3. Circle THREE numbers that, when rounded to the nearest ten, will round to 60.

64	68	56	57	67	72

4. Write the number that correctly completes the subtraction equation.

   [917] − 723 = 194

5. What is 538 rounded to the nearest ten?

   Ⓐ 550
   Ⓑ 540
   Ⓒ 500
   Ⓓ 600

Chapter 2 PRACTICE TEST

6. Part A

Solve the two-step word problem.

There are three third-grade classes, and each has 22 students. Eight third graders are absent today. How many third graders are in school today?

Write out your equation and solve it.

$3 \times 22 - 8 = x$

$66 - 8 = x$

$58 = x$

Part B

Explain how you can use estimation to check your answer.

Sample answer: I can use estimation by rounding 22 down to 20 and rounding 8 up to 10. The equation is $20 \times 3 - 10$, or $x = 50$. This is close to the answer of 58, so the answer is reasonable.

7. What is 93 + 48?

Ⓐ 45

Ⓑ 131

Ⓒ 135

Ⓓ 141

8. Jenny was doing a science project on the water cycle. She started off with 16 bottles of water and then used 7 of them. She then bought 9 more bottles. How many bottles of water did she have left? Write the numbers in the boxes to complete the equation.

18 = 16 − 7 + 9

She had 18 bottles left.

9. Part A

Write the equation that each multiplication table shows.

×	0	1	2	3	4	5	6	7	8	9
0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9
2	0	2	4	6	8	10	12	14	16	18
3	0	3	6	9	12	15	18	21	24	27
4	0	4	8	12	16	20	24	28	32	36
5	0	5	10	15	20	25	30	35	40	45
6	0	6	12	18	24	30	36	42	48	54
7	0	7	14	21	28	35	42	49	56	63
8	0	8	16	24	32	40	48	56	64	72
9	0	9	18	27	36	45	54	63	72	81

$8 \times 2 = 16$

×	0	1	2	3	4	5	6	7	8	9
0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9
2	0	2	4	6	8	10	12	14	16	18
3	0	3	6	9	12	15	18	21	24	27
4	0	4	8	12	16	20	24	28	32	36
5	0	5	10	15	20	25	30	35	40	45
6	0	6	12	18	24	30	36	42	48	54
7	0	7	14	21	28	35	42	49	56	63
8	0	8	16	24	32	40	48	56	64	72
9	0	9	18	27	36	45	54	63	72	81

$2 \times 8 = 16$

Part B

Explain what the equations in Part A tell you.

Sample answer: The products are equal. This means that factors can be multiplied in any order and the product will not change.

10. Which number correctly completes the addition equation?

866 + 125 = □

Ⓐ 741

Ⓑ 781

Ⓒ 881

Ⓓ 991

11. Which is the rule for the series?

6, 12, 18, 24, 30 . . .

Ⓐ "add 6"
Ⓑ "add 8"
Ⓒ "multiply by 2"
Ⓓ "multiply by 6"

12. Select THREE numbers that round to 800 when rounded to the nearest hundred.

Ⓐ 735
Ⓑ 805
Ⓒ 761
Ⓓ 825
Ⓔ 897

13. What can you tell from the series 8, 16, 24, 32, 40 . . .? Complete the statement.

The product of an odd number and 8 equals an [even] number.

14. Look at equations A, B, and C.

A: $5 \times 3 - 5 = x$ B: $2 + 5 \times 3 = x$ C: $3 + 12 - 1 = x$

Compare the values of x in each equation in the boxes.
Write a letter in each box.

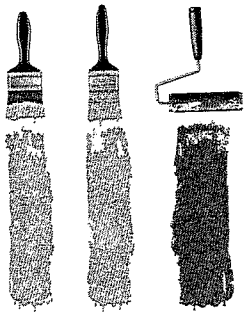
[A] < [C] < [B]

15. Look at the multiplication table.

×	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10
2	0	2	4	6	8	10	12	14	16	18	20
3	0	3	6	9	12	15	18	21	24	27	30
4	0	4	8	12	16	20	24	24	24	24	24
5	0	5	10	15	20	25	30	35	40	45	50
6	0	6	12	18	24	30	36	42	48	54	60
7	0	7	14	21	28	35	42	49	56	63	70
8	0	8	16	24	32	40	48	56	64	72	80
9	0	9	18	27	36	45	54	63	72	81	90
10	0	10	20	30	40	50	60	70	80	90	100

Write a number in each box to correctly complete the chart.

Factor	Factor	Product
3	3	9
5	6	30
6	6	36
9	6	54
10	6	60



GUIDED INSTRUCTION

A wall is going to be painted in stripes. Fractions can be used to say how much of the wall has been painted.

1. Write the fraction that stands for the shaded part of the rectangle.

Step One How many equal parts is the rectangle divided into? This is the denominator.

The rectangle is divided into 3 equal parts. The denominator is 3.

Step Two How many parts are shaded? This is the numerator.

One part is shaded. The numerator is 1.

Step Three Write the fraction. The denominator is on the bottom and the numerator is on the top.

The fraction $\frac{1}{3}$ stands for the shaded part of the rectangle.

TURN AND TALK

How can you write a fraction for the unshaded part of the rectangle?

2. Three friends have ribbons that are the same length.

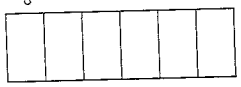
Jon cut his ribbon into sixths.

Gabe cut his ribbon into eighths.

Melissa cut her ribbon into fourths.

Whose pieces of ribbon are the longest?

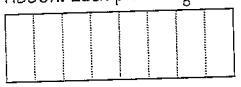
Step One Draw the cuts to represent Jon's ribbon. Each piece is $\frac{1}{6}$ of the whole.



TURN AND TALK

Who has the shortest pieces of ribbon?

Step Two Draw the cuts on your own to represent Gabe's ribbon. Each piece is $\frac{1}{8}$ of the whole.

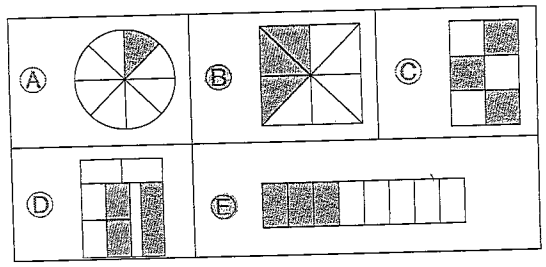


Step Three Draw the cuts on your own to represent Melissa's ribbon. Each piece is $\frac{1}{4}$ of the whole.

Step Four Determine whose pieces of ribbon are the longest.

Melissa's pieces of ribbon are the longest.

3. Select TWO models that show $\frac{3}{8}$ shaded.



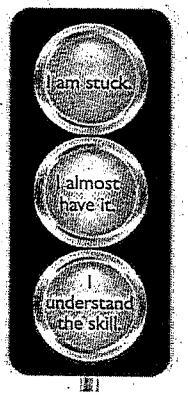
HINT, HINT

Make sure that each shape is divided equally into parts. Count all of the parts to find the bottom number of the fraction, known as the denominator. Then count the shaded parts to find the top number of the fraction, known as the numerator.

SKETCH IT

Draw a sketch of your classroom wall to help you write a fraction.

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



How Am I Doing?

What questions do you have?

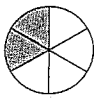
Look at one wall of your classroom. Write a fraction that stands for the amount of the classroom wall that is covered by the board or the windows. What fraction of the classroom wall is not covered?

How can you use a fraction to determine how much of a pencil has been used?

INDEPENDENT PRACTICE

Answer the questions.

1. Which fraction describes the shaded part of the circle?



Ⓐ $\frac{2}{6}$

Ⓑ $\frac{6}{4}$

Ⓒ $\frac{4}{6}$

Ⓓ $\frac{6}{2}$

HINT, HINT

The numerator (top number) is the number of shaded parts.

2. What fraction of the triangle is shaded?
Write your answer in the box.

$\frac{3}{4}$

3. Write the number in the box that correctly completes the statement.

The denominator is 6.

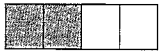
HINT, HINT

The denominator of a fraction is the total number of equal parts of the whole.

WORK SPACE

4. Each model shown has been shaded to represent a fraction. Which model shows $\frac{1}{4}$ shaded?

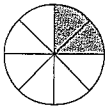
Ⓐ 

Ⓑ 

Ⓒ 

Ⓓ 

5. What fraction of the circle is shaded? Write a number in each box.



$\frac{2}{8}$

6. Part A

Marco orders a large pizza. He eats $\frac{1}{4}$ of the pizza.

Ali orders a small pizza. She eats $\frac{1}{4}$ of the pizza.

Who ate more pizza?

Write your answer in the box.

Marco

Part B

Explain how you found your answer.

Sample answer: When a large pizza is divided into fourths, the pieces are bigger than when a small pizza is divided into fourths. So, $\frac{1}{4}$ of a large pizza is more than $\frac{1}{4}$ of a small pizza.

SKETCH IT

Drawing a picture or model can help you solve a problem.

WORK SPACE

7. Part A

A bulletin board is split into 3 sections. The shaded area shows the part of the bulletin board that is filled.

James says that $\frac{1}{3}$ of the bulletin board is filled. Cara says that James is not correct. Explain who is correct.

Cara is correct. Sample explanation: The bulletin board is not divided into equal parts, so each part does not show one-third.

Lesson 11 UNDERSTAND FRACTIONS

EXIT TICKET

3.NF.1

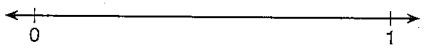
Now that you have mastered recognizing and modeling fractions, let's solve the problem in the Real-World Connection.

Jill drew a square on the pavement to play a game. She divided the square into 4 equal parts. Jill will stand on one part. On what fraction of the square will Jill stand? On what fraction of the square will the other players stand?

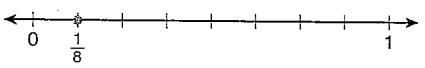
Draw a picture to solve the problem.

Sample answer: Jill will stand in $\frac{1}{4}$ of the square. The other players will stand in $\frac{3}{4}$ of the square.

3. Divide the number line to show the point $\frac{1}{8}$.



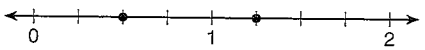
The denominator of $\frac{1}{8}$ is 8. Divide the line into 8 equal parts. The numerator is 1. Place a mark at the end of the first part. Now write $\frac{1}{8}$ below the point.



TURN AND TALK

How many equal sections are there between 0 and 1? What happens to the numerator of the fractions after you pass the 1?

4. Which fractions are marked on the number line? Select TWO correct answers.



Ⓐ $\frac{2}{8}$

Ⓑ $\frac{2}{4}$

Ⓒ $\frac{2}{3}$

Ⓓ $\frac{5}{4}$

Ⓔ $\frac{5}{8}$

How Am I Doing?

What questions do you have?

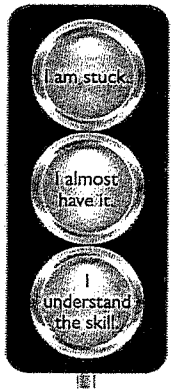
Explain how you can identify the correct number of equal parts along the number line.

What happens to the numerator of the fraction after you pass the number 1?

TURN AND TALK

Work with a partner to answer the following: Isaac represented a fraction on a number line. What must be true about the numerator of the fraction compared to the denominator?

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



WORK SPACE

INDEPENDENT PRACTICE

Answer the questions.

1. Which describes how to show $\frac{2}{8}$ on the number line?

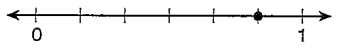
   (A) Divide the distance from 0 to 1 into 2 equal sections. Place a mark at the end of the 8th section.

   (B) Divide the distance from 0 to 1 into 8 equal sections. Place a mark at the end of the 2nd section.

   (C) Divide the distance from 0 to 8 into 8 equal sections. Place a mark at the end of the 2nd section.

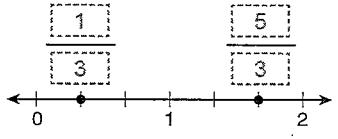
   (D) Divide the distance from 0 to 2 into 8 equal sections. Place a mark at the end of the 2nd section.

2. What fraction does the number line show? Write your answers in the boxes.



$\frac{\boxed{5}}{\boxed{6}}$

3. Label the fractions on the number line. Write your answers in the boxes.



4. Select TWO statements that are true about the number line.

   (A) Point *A* shows $\frac{2}{8}$.

   (B) Point *B* shows $\frac{3}{8}$.

   (C) Point *C* shows $\frac{4}{8}$.

   (D) Point *D* shows $\frac{5}{8}$.

5. Complete the table to show the position of each fraction from left to right on a number line in order from 1–3.

Fraction	Order
$\frac{3}{8}$	1
$\frac{7}{8}$	3
$\frac{6}{8}$	2

6. Rob folds a fraction strip.

What fraction should he write at the fold?

Write the numbers in the boxes.

$\frac{\boxed{1}}{\boxed{2}}$

HINT, HINT

The number line is divided into equal parts. How many parts do you have to count for each fraction?

WORK SPACE

7 Part A

Draw lines to divide the number line into equal parts. Then mark and label the fraction $\frac{2}{4}$.

Part B

Explain how you know your number line is correct.

Sample answer: The denominator is 4, so I divided the segment into 4 equal parts. The numerator is 2, so I counted 2 parts from 0 to show $\frac{2}{4}$.

8 Emily says the number line shows $\frac{1}{3}$, because the point is at the end of the first part. Is Emily correct? Explain why or why not.

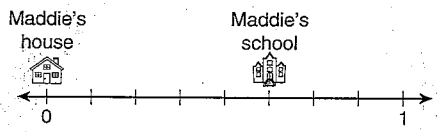
Sample answer: Emily is not correct because the segment from 0 to 1 is not partitioned into equal parts. Each segment does not show $\frac{1}{3}$.

EXIT TICKET

3.NF.2, 3.NF.2a, 3.NF.2b

Now that you have mastered how to represent fractions on a number line, let's solve the problem in the Real-World Connection.

Maddie's house is on the same street as her school. The street is 1 mile long. It is divided into equal-sized blocks. How far is Maddie's house from her school? Explain how you know.

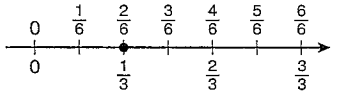


There are 5 parts from Maddie's house to the school. Each part is an eighth of a mile. There are 5 one-eighth parts so the distance from Maddie's house to the school is $\frac{5}{8}$ mile.

EXAMPLE

The number line is divided into thirds and sixths.

$\frac{1}{3}$ names the same point as $\frac{2}{6}$. The fractions $\frac{1}{3}$ and $\frac{2}{6}$ are equivalent.



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

You can write whole numbers as fractions and find fractions equivalent to whole numbers.

TURN AND TALK

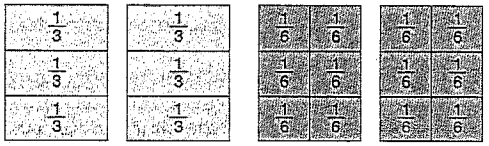
Think about fractions that are equivalent to whole numbers. How does the numerator (top number) compare to the denominator (bottom number)?

EXAMPLE

Look at the models. Both models show 2 wholes.

In the first model, each whole is divided into 3 equal parts.

In the second model, each whole is divided into 6 equal parts.



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

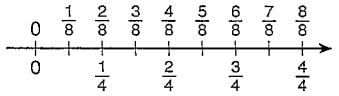
$\frac{6}{3}$ and $\frac{12}{6}$ both equal 2 wholes. $\frac{6}{3}$ and $\frac{12}{6}$ are equivalent fractions.

Cutting a pizza into different numbers of slices shows equivalent fractions for the same whole.

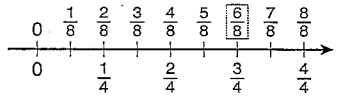
$1 = \frac{2}{2} = \frac{4}{4} = \frac{8}{8}$

GUIDED INSTRUCTION

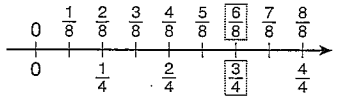
1. Jonah runs $\frac{6}{8}$ mile. Use the number line to find a fraction equivalent to $\frac{6}{8}$.



Step One Locate $\frac{6}{8}$ on the number line.



Step Two Find the fraction that names the same point as $\frac{6}{8}$.



Step Three Solve the problem.

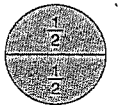
$\frac{6}{8} = \boxed{\frac{3}{4}}$

Jonah runs $\boxed{\frac{3}{4}}$ mile.

HINT, HINT

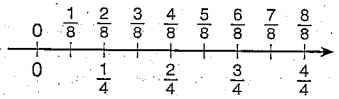
Fractions that name the same point are equivalent.

2. Write the equivalent fraction.



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

3. Select TWO fractions that are equivalent.



Ⓐ $\frac{1}{4}$ and $\frac{2}{8}$

Ⓑ $\frac{5}{8}$ and $\frac{3}{4}$

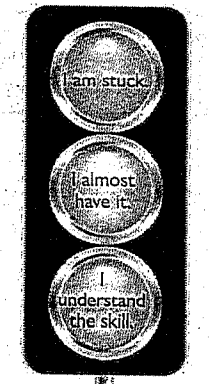
Ⓒ $\frac{2}{4}$ and $\frac{3}{4}$

Ⓓ $\frac{8}{8}$ and $\frac{4}{4}$

TURN AND TALK

With the help of a partner, answer this question: Eliana believes that $\frac{1}{2}$ and $\frac{4}{8}$ are equivalent fractions. How can she prove this?

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



How Am I Doing?

What questions do you have?

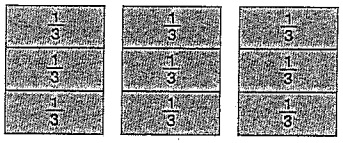
Think about times when you shared an item with friends. How can finding fractions equivalent to a whole number help you share something with friends?

Have you ever measured out ingredients for a recipe? How can equivalent fractions help you when cooking or baking?

INDEPENDENT PRACTICE

Answer the questions.

1. What fraction is equivalent to 3?
Write your answer in the box.



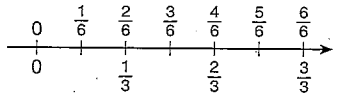
$3 = \frac{\boxed{9}}{3}$

HINT, HINT

How many thirds do you see? Count them carefully.

WORK SPACE

2. Select the TWO fractions that are equivalent.



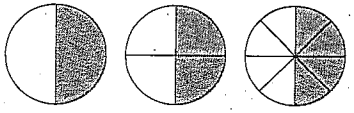
Ⓐ $\frac{2}{3}$ and $\frac{3}{6}$

Ⓑ $\frac{1}{6}$ and $\frac{3}{5}$

Ⓒ $\frac{2}{3}$ and $\frac{4}{6}$

Ⓓ $\frac{2}{6}$ and $\frac{1}{3}$

3. Write the numbers in the box to make equivalent fractions.



$\frac{1}{2} = \frac{\boxed{2}}{\boxed{4}} = \frac{\boxed{4}}{\boxed{8}}$

4. Part A

Ron made a pizza. There is $\frac{4}{6}$ of the pizza left. Which fraction is equivalent to $\frac{4}{6}$?

Ⓐ $\frac{1}{2}$ Ⓑ $\frac{2}{3}$

Ⓒ $\frac{2}{4}$ Ⓓ $\frac{6}{8}$

Part B

Explain why your answer is equal to $\frac{4}{6}$.

Sample answer: The fraction $\frac{4}{6}$ means one whole is divided into 6 equal parts and 4 of the parts are counted. If you divide the whole into 3 parts, 2 of the parts would take up the same part of the whole.

SKETCH IT

In the margin below, draw a model or number line to help you. Make sure your model shows equal parts.

5. What is another fraction equal to 1? Use the model to justify your answer.

Sample answer:

$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$

$\frac{8}{8}$ parts, and all 8 parts are shaded. One whole is shaded.

6. Part A

Skylar has 6 sandwiches. She cuts each sandwich in half. What fraction represents all of the sandwich halves?

$\frac{12}{2}$

Part B

Suppose Skylar cuts each sandwich half into 2 equal parts. What fraction represents all of the sandwich parts now? Explain your answer.

Sample answer: Cutting the halves in half makes fourths. There were 12 halves. Now there are 24 fourths. The fraction $\frac{24}{4}$ names the sandwich parts.

EXIT TICKET

3.NF.3, 3.NF.3a, 3.NF.3b, 3.NF.3c

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

Ben and Ollie each have burritos that are the same size. Ben cuts his burrito into fourths and eats two pieces. Ollie cuts his burrito into sixths. Ollie eats the same fraction of burrito as Ben. How can you use equivalent fractions to find how many pieces of his burrito Ollie eats? Draw a picture to help you.

Sample answer: Ben eats $\frac{2}{4}$ of his burrito. I know that $\frac{2}{4}$ and $\frac{3}{6}$ are equivalent because in the models, the total shaded areas are the same size.

Sample model:

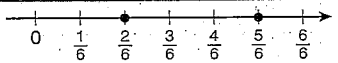
Ben	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$		
Ollie	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$

HINT, HINT

When using a number line to compare, the number to the left is less and the number to the right is greater.

You can also use a number line to compare fractions.

EXAMPLE



$\frac{2}{6}$ is to the left of $\frac{5}{6}$. So, $\frac{2}{6} < \frac{5}{6}$.

You can compare fractions with the same numerator.

When the numerators are the same, look at the denominators to compare the size of the parts. The fraction with the smaller denominator is the greater number.

TURN AND TALK

Write a fraction that has a numerator of 6 and a denominator of any number you want. Compare your fraction to your partner's and decide which is greater.

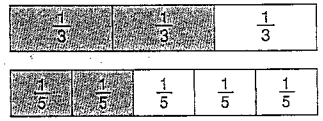
EXAMPLE

Mr. Richardson needs $\frac{2}{3}$ of a cup of cocoa and $\frac{2}{5}$ of a cup of butter to make brownies. Does he need more cocoa or more butter?

Compare $\frac{2}{3}$ and $\frac{2}{5}$.

Look at the model. Each whole is the same size.

One whole is divided into 3 equal parts, and the other is divided into 5 equal parts.



The more parts the whole is divided into, the smaller each part is.

The fewer parts a whole is divided into, the larger each part is.

The greater fraction has the larger amount of the whole shaded.

$\frac{2}{3}$ is greater than $\frac{2}{5}$. So, $\frac{2}{3} > \frac{2}{5}$.

GUIDED INSTRUCTION

1. Annie and Erin each have the same size paper. Annie colors $\frac{2}{3}$ of her paper blue. Erin colors $\frac{1}{3}$ of her paper blue. Which girl's paper has more blue?

The denominators are the same, so you can compare the numerators of the fractions.

Step One Look at the numerators in each fraction.

$\frac{2}{3} \bigcirc \frac{1}{3}$

Step Two Compare the numerators. Write >, =, or <.

$\frac{2}{3} \textcircled{>} \frac{1}{3}$

Step Three Solve the problem.

Annie's paper has more blue.

SKETCH IT

In the margin below, draw a model or a number line to compare the fractions. Show what your model would look like for each comparison.

2. Carla and Willa each have apples that are the same size. Carla eats $\frac{4}{8}$ of her apple. Willa eats $\frac{4}{6}$ of her apple. Who eats more of her apple?

The numerators are the same, so you can compare the denominators of the fractions.

Step One Look at the denominators in each fraction.

$\frac{4}{8} \bigcirc \frac{4}{6}$

Step Two Compare the denominators. The more parts the whole is divided into, the smaller the parts are. Write >, =, or <.

$\frac{4}{8} \textcircled{<} \frac{4}{6}$

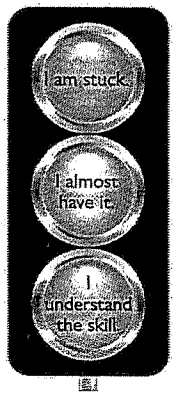
Step Three Solve the problem.

Willa eats more of her apple.

SKETCH IT

Jesse divides a pizza into slices. Will the slices be larger if he divides the pizza into 6 slices or 8 slices? Draw models in the margin below to explain.

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



How Am I Doing?

What questions do you have?

When is a time when you might need to compare fractions?

Carpenters use fractions when measuring and cutting pieces of wood. Why do you think it would be important for the carpenter to know how to compare fractions? For example, what would happen if a piece of wood is greater than or less than a given length?

INDEPENDENT PRACTICE

WORK SPACE

Answer the questions.

1. Compare. Use >, <, or =. Write your answer in the circle.

   $\frac{5}{8}$ (<) $\frac{5}{6}$

2. Which comparison is NOT true?

   (A) $\frac{1}{2} > \frac{1}{4}$

   (B) $\frac{2}{8} < \frac{5}{8}$

   (C) $\frac{1}{6} = \frac{1}{6}$

   (D) $\frac{1}{8} > \frac{1}{3}$

3. Which fraction is NOT greater than $\frac{2}{4}$?

   (A) $\frac{2}{3}$

   (B) $\frac{3}{4}$

   (C) $\frac{2}{2}$

   (D) $\frac{1}{4}$

4. When two fractions have the same numerator, compare the denominators. Is the fraction with the greater denominator greater than, less than, or equal to the fraction with the lesser denominator?

   Write your answer in the box.

   less than

HINT, HINT

The *greater than* or *less than* sign always "points" at the number that is less.

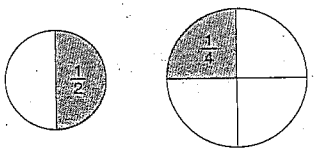
5. Write the correct symbol in each box to compare the fractions.

$\frac{1}{8} \boxed{<} \frac{1}{6} \boxed{<} \frac{3}{6}$

WORK SPACE

6. Jon says $\frac{1}{4} > \frac{1}{2}$, and he made the drawing below to show that he is right.

What is John's error? Explain your answer.



Sample answer:
John didn't compare two wholes that are the same size. To compare fractions, you have to start with the same-size whole. When two wholes that are the same size are divided into halves and fourths, one half is greater than one fourth.

7. Part A

Write a possible numerator in the box so that the comparison is true.

$\frac{3}{4} > \frac{\boxed{1}}{4}$ Sample answers: 0, 1, 2

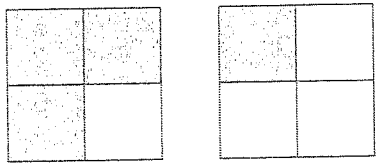
SKETCH IT

In the margin below, draw a picture to show the two fractions. Use the picture to explain how the denominators and the numerators compare.

Part B

Draw a picture to justify your answer.

Sample answer:



Part C

Explain your thinking.

When the denominators are the same, it means that the wholes are divided into the same number of parts. More parts means a greater fraction of the whole. So, $\frac{3}{4}$ is greater than $\frac{1}{4}$.

3.NF3, 3.NF3d

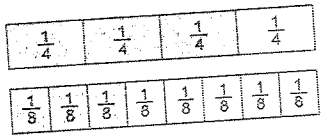
EXIT TICKET

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

Dean and Kelly both like to hike. They hike $\frac{3}{4}$ mile and stop for a rest. Then, they hike $\frac{3}{8}$ mile more. Did Dean and Kelly hike a greater distance before they rested or after they rested? Draw a picture to help you.

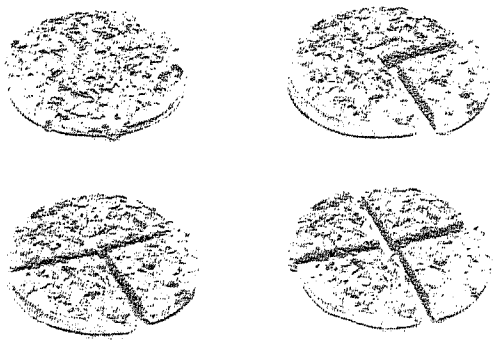
Dean and Kelly hiked a greater distance before they rested.

Sample model:



GUIDED INSTRUCTION

When you share food, you often want to have equal-size parts. This pizza is divided into fourths.



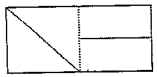
1. Partition the rectangle into 4 parts with equal areas.

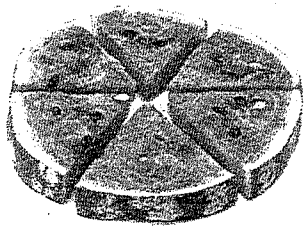
HINT, HINT

Equal parts do not have to be the same shape, but they must have the same area.

Step One First draw a line to make 2 equal parts.

Step Two Divide each half into 2 equal parts to make 4 equal parts.





2. Write the fraction that names the area of each part of the whole.

Step One Count the number of equal-sized parts.

There are 6 equal-size parts.

Step Two Write the fraction that names each part.

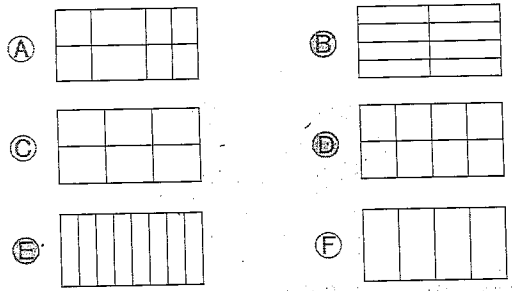
Each part is one sixth of the area of the whole rectangle.

One sixth = $\frac{1}{6}$

THINK ABOUT IT

The word **half** can be written as a fraction like $\frac{1}{2}$. What are some other fraction words like **half**?

3. Select THREE shapes that show eighths.



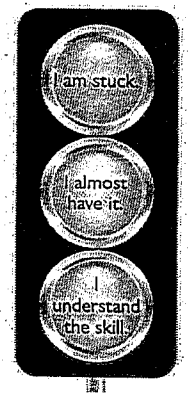
HINT, HINT

The word **eighths** has the word **eight** in it. Look for shapes with eight equal parts.

SKETCH IT

On a separate piece of paper draw three identical shapes. Draw lines to divide the first shape into halves, the second shape into thirds, and the third shape into fourths. Shade 1 part of each shape and write a fraction for the shape. Then compare the shaded parts of the shapes. What do you notice about the size of the shaded parts compared to the denominators of the fractions?

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



How Am I Doing?

What questions do you have?

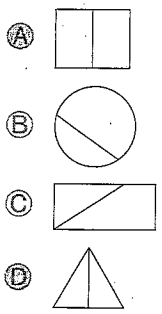
Describe two different ways to divide a rectangle into 4 equal parts.

Describe a time when you or someone in your family wanted something divided into equal parts.

INDEPENDENT PRACTICE

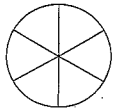
Answer the questions.

1. Select TWO shapes that are divided into parts with equal areas.



2. Which number correctly completes the statement?

The circle has ☐ equal parts.

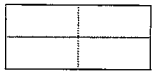


Ⓐ 8
Ⓑ 6
Ⓒ 4
Ⓓ 2

SKETCH IT

Mark each part as you count around the circle. Say one number for each part.

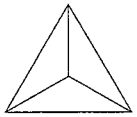
3. Draw lines to separate the shape into four equal parts.



WORK SPACE

4. Draw lines to separate the shape into three equal parts.

5. Which fraction names the area of each part of the whole?



Ⓐ $\frac{1}{2}$

Ⓑ $\frac{1}{3}$

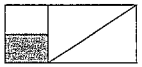
Ⓒ $\frac{1}{4}$

Ⓓ $\frac{3}{3}$

6. Part A

Clyde says he shaded $\frac{1}{4}$ of the shape.

What mistake did Clyde make?

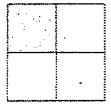


Sample answer: Clyde's shape is not partitioned into equal parts, so the part he shaded is not $\frac{1}{4}$ of the whole.

6. Part B

Draw a shape and shade $\frac{1}{4}$ of it.

WORK SPACE



6. Part C

Explain your drawing.

Sample answer: I drew a square and divided it into 4 equal parts. The area of each part is $\frac{1}{4}$ of the whole, so I shaded one part.

7. The rectangle is divided into fourths. Explain why this is true.

Sample answer: The rectangle was divided into equal parts. Then each half was divided into 2 equal parts, making 4 equal parts. Each part has the same area.

EXIT TICKET

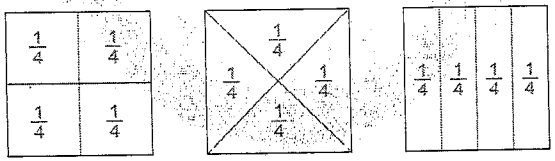
3.G.2

Now that you have mastered dividing shapes into equal-size parts, let's solve the problem in the Real-World Connection.

Pat uses the same loaf of bread to make 3 sandwiches. Pat wants to cut each sandwich into 4 equal parts.

How can Pat cut each sandwich in different ways into the same number of equal parts? Explain your answer and show three different ways Pat can cut the bread.

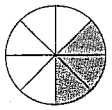
Sample answer: If the bread is square, here are 3 ways to divide the sandwiches. Each sandwich is divided into fourths. The parts of each sandwich have the same area and are $\frac{1}{4}$ of the sandwich, but they have different shapes.



PRACTICE TEST

Answer the questions.

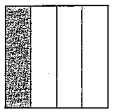
1. What fraction of the circle that is shaded? Write your answer in each box.



$\frac{3}{8}$

2. Each model shown has been shaded to represent a fraction. Which model shows $\frac{3}{4}$ shaded?

Ⓐ 

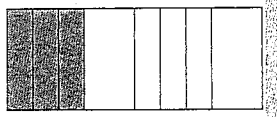
Ⓑ 

Ⓒ 

Ⓓ 

3. Part A

A lawn is divided into 8 segments. The shaded area shows the part of the lawn that has been mowed.



Daniel says that $\frac{3}{8}$ of the lawn has been mowed.
Maureen says that less has been mowed, while Kendrick says that more has been mowed.
Which person is correct? Write the name in the box.

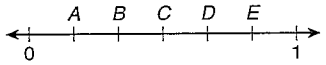
Maureen

Part B

Explain why the person you chose is correct.

Sample answer: Less than $\frac{3}{8}$ of the lawn has been mowed. I can tell because the segments are not equal in size, and one of the segments that has not been mowed is larger than the others.

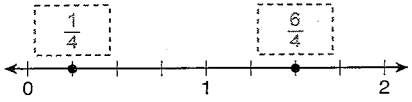
4. Which letter on the number line shows $\frac{2}{3}$?



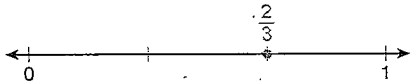
Write the correct letter in the box.

D

5. Label the fractions on the number line. Write your answer in each box.



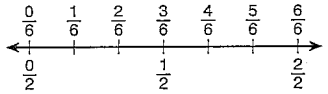
6. Draw lines to divide the number line into equal parts. Then mark and label the fraction $\frac{2}{3}$.



7. Complete the table to show the position of each fraction from left to right on a number line in order from 1–3.

Fraction	Order
$\frac{4}{8}$	2
$\frac{9}{8}$	3
$\frac{1}{8}$	1

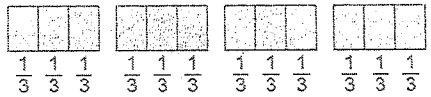
8. Cassie colors $\frac{1}{2}$ of her paper in art class. Use the number line to find a fraction equivalent to $\frac{1}{2}$.



Write your answer in the box.

Cassie colors $\frac{3}{6}$ of her paper in art class.

9. There are 12 people eating dinner. Each person wants $\frac{1}{3}$ of a pizza. How many pizzas are needed? Draw a picture to show how many pizzas are needed. Then explain your answer.

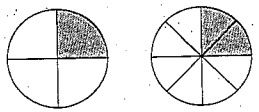


Sample answer: Four pizzas are needed because $\frac{12}{3} = 4$.

I drew fraction models to solve.

I needed $\frac{12}{3}$, which made 4 wholes, so $\frac{12}{3} = 4$.

10. Write numbers in the boxes to make equivalent fractions.



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

11. Select TWO of the fractions that are less than $\frac{3}{4}$.

Ⓐ $\frac{3}{3}$

Ⓑ $\frac{3}{8}$

Ⓒ $\frac{1}{4}$

Ⓓ $\frac{3}{4}$

Ⓔ $\frac{5}{8}$

12. Write symbols in the boxes to compare the fractions.

$\frac{3}{4}$ [=] $\frac{3}{4}$ [>] $\frac{3}{8}$

13. Which comparison is true?

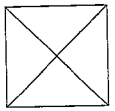
Ⓐ $\frac{1}{3} > \frac{2}{3}$

Ⓑ $\frac{2}{4} = \frac{4}{6}$

Ⓒ $\frac{1}{4} > \frac{1}{6}$

Ⓓ $\frac{1}{6} < \frac{1}{8}$

14. What fraction names the area of each part of the whole?



Write your answer in the box. [$\frac{1}{4}$]

15. Draw a shape and shade $\frac{1}{2}$ of it. Explain your drawing.

Sample answer:

I drew a triangle and partitioned it into 2 equal parts. The area of each part is $\frac{1}{2}$ of the whole, so I shaded one part.

16. Which fraction names the area of each part of the whole?

Ⓐ $\frac{3}{4}$

Ⓑ $\frac{1}{3}$

Ⓒ $\frac{3}{3}$

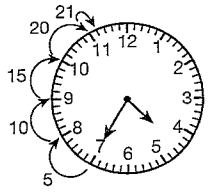
Ⓓ $\frac{1}{4}$

TIPS AND TRICKS

Instead of skip-counting by fives, you can use multiplication. From the 7 to the 11, there are 4 groups of 5 minutes so $4 \times 5 = 20$, and $20 + 1$ extra minute $= 21$.

Step Two Count the minutes to the end time.

Count by fives and ones.



5, 10, 15, 20, 21

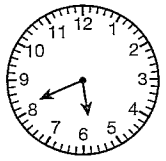
Step Three Write the time that has passed in the box.

Tyler read for [21] minutes.

HINT, HINT

How many minutes is it until the next hour? How many minutes are past the hour?

3. Select THREE times that match the time shown on the clock.



- (A) 41 minutes after 5
- (B) 19 minutes before 4
- (C) 5:41
- (D) 19 minutes before 6
- (E) 6:41
- (F) 41 minutes after 4

How Am I Doing?

What questions do you have?

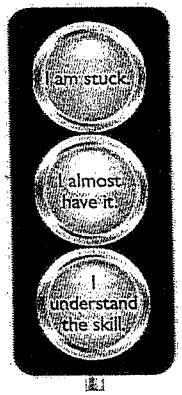
Can you tell what time it is right now on the analog clock in your classroom? If you only have a digital clock in your classroom, draw the time it is right now on an analog clock below.

SKETCH IT

If the time is between 2 and 3 o'clock, then the hour hand should be between the 2 and 3 on the clock.

Time is important in our lives. You need to know what time to get to your soccer game, so you need to think about what time to start getting your uniform on. What are other situations where knowing the exact time in hours and minutes is important?

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

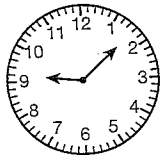


WORK SPACE

INDEPENDENT PRACTICE

Answer the questions.

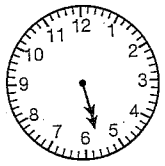
1. What time does the clock show?



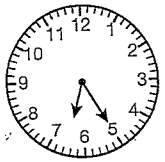
Write your answer in the box.

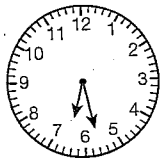
9 : 08

2. Yasmin finished dinner at 6:28. Which clock shows the time she finished dinner?

Ⓐ 

Ⓑ 

Ⓒ 

Ⓓ 

WORK SPACE

3. Eli started practicing guitar at 10:20. He stopped practicing at 10:52. How long did Eli practice guitar?

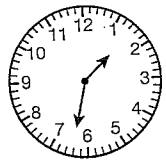
Ⓐ 20 minutes

Ⓑ 27 minutes

Ⓒ 32 minutes

Ⓓ 37 minutes

4. Select TWO times that match the time shown on the clock.



Ⓐ thirty-two minutes before one

Ⓑ one twenty-three

Ⓒ twenty-eight minutes before two

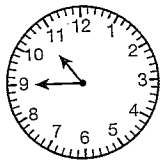
Ⓓ thirty-two minutes after two

Ⓔ one thirty-two

Ⓕ twenty-eight minutes after two

5. Carlos starts running at 10:45. He finishes running at 11:08. How long does Carlos run?

Write your answer in the box.



23 minutes

WORK SPACE

6. What is one time when the hour hand and the minute hand both point to the same number? Explain your answer.

Sample answer: 12:00

Sample answer: At 12:00, the hour hand and the minute hand both point to the 12.

7. Part A

When Ben ate a snack, the hour hand was between the 2 and the 3.

The minute hand was on the 10.

What time did Ben eat a snack?

Write your answer in the box.

2 : 50

Part B

Mai ate a snack 12 minutes after Ben. When did Mai eat a snack? Explain your answer.

Mai ate a snack at 3:02.

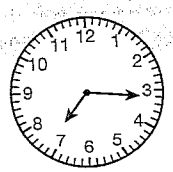
Sample answer: I counted 1 ten and 2 ones from 2:50: 3:00, 3:01, 3:02.

EXIT TICKET

3.MD.1

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

Mary leaves for school at the same time each morning. The clock shows the time she leaves.



At what time does Mary leave for school? Explain your answer.

Mary leaves for school at 7:16.

The hour hand is pointing just after the 7, so the time on the clock is after 7.

Counting by fives, and then one more, the minute hand is 16 minutes after the hour: 5, 10, 15, 16.

The time is 7:16, or seven sixteen.

EXAMPLE

Recess starts at 10:15 A.M. and ends at 10:35 A.M. How long does recess last?

Subtract the times:

10:35 end time
− 10:15 start time
0:20

Recess is 20 minutes long.

GUIDED INSTRUCTION

Sometimes you start doing something because you are waiting to do something else at a certain time. Maybe you start reading because soccer practice is in half an hour.

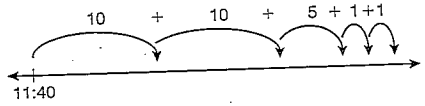
1. Abe starts reading at 11:40 A.M. He stopped reading 27 minutes later.

   At what time did Abe stop reading?

   Step One Use a number line to represent the problem.

   Write 11:40 as the starting time.

   Count on to reach 27 minutes.

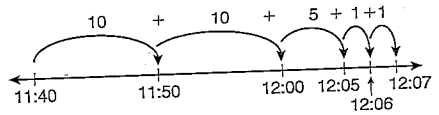


HINT, HINT

If an event lasts past the hour, it helps to count the time up to the hour and then after the hour.

Step Two Write the times of each jump on the number line.

The end of the last jump is the time Abe stopped reading.



Step Three Solve the problem, making sure to include A.M. or P.M. in your answer.

Abe stopped reading at 12:07 P.M.

2. Cody rode the bus to his grandmother's house. Cody got on the bus at 1:36 P.M. He got off the bus at 1:49 P.M. How long was Cody's bus ride?

   Step One Use subtraction to find the difference.

   1:49 end time
   − 1:36 start time
   0:13 amount of time on the bus

   Step Two Solve the problem.

   Cody's bus ride was 13 minutes long.

TURN AND TALK

You have several ways to think about solving problems with time. Which method do you understand best? Why?

3. The table shows the start and end times of two events at the zoo.

   What times complete the table?

   Write your answers in the boxes.

Event	Start time	End time	Event length
Lion feeding	12:15 P.M.	12:32 P.M.	17 minutes
Gorilla viewing	2:10 P.M.	2:35 P.M.	25 minutes

TIPS AND TRICKS

Decide if you should add or subtract to find the answers. Then fill in the missing information. Remember to include A.M. or P.M. in your answer if your answer is a time.

TURN AND TALK

Work with a partner. Pick two activities you do on a school day such as getting dressed or going to school. Think about how much time each activity takes. Write two time problems about your activities where start time, end time, or elapsed time needs to be calculated. Then solve the problems.

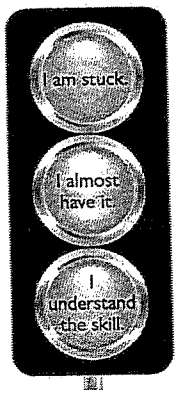
How Am I Doing?

What questions do you have?

Determine how much time goes by between the start of your school day and your first recess. Explain.

How long does it take to get home from school? How long is lunch? What are some other situations where you figure out how long something takes?

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



INDEPENDENT PRACTICE

Answer the questions.

1. Gus started walking to school at 7:28 A.M. He arrived at school 15 minutes later. When did Gus arrive at school?

   (A) 7:13 A.M.
   (B) 7:43 A.M.
   (C) 7:45 A.M.
   (D) 7:48 A.M.

2. Jamal is going to meet his family at the hiking trail at 12:00 p.m. Jamal arrives 20 minutes early. When does Jamal arrive at the hiking trail?

   Use A.M. or P.M. Write your answer in the box.

   11:40 A.M.

3. The table shows the starting and ending times of some movies. Select THREE movies that are longer than 20 minutes.

Movie title	Start time	End time
Bees Buzz	10:05 A.M.	10:17 A.M.
Whale Songs	10:35 A.M.	10:57 A.M.
When Birds Fly	11:15 A.M.	11:41 A.M.
Total Tornadoes	12:40 P.M.	12:55 P.M.
3, 2, 1, Liftoff!	1:10 P.M.	1:30 P.M.
Our Green Earth	2:25 P.M.	3:00 P.M.

   (A) Bees Buzz
   (B) Whale Songs
   (C) When Birds Fly
   (D) Total Tornadoes
   (E) 3, 2, 1, Liftoff!
   (F) Our Green Earth

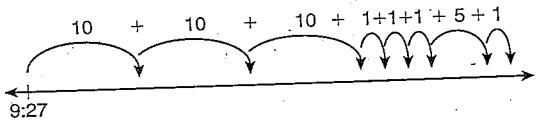
TIPS AND TRICKS

You know from the question that three of the answers are correct. Read each row of the table. Find the difference between the start and end times. Select all the answer choices that name movies with lengths greater than 20 minutes.

WORK SPACE

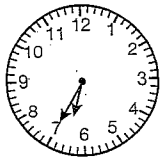
4. Juan went into the grocery store at 9:27 A.M. He left the grocery store at 10:06 A.M. How long was Juan in the store?

You can use the number line to help you solve the problem.



Ⓐ 29 minutes
Ⓑ 35 minutes
Ⓒ 37 minutes
Ⓓ 39 minutes

5. Kyra got home from her dance lesson at 6:35 P.M. It took her 30 minutes to eat dinner, and 10 minutes to take a bath. Then it took her 7 minutes to clean up her room and get ready to go to bed.



What time will Kyra be ready to go to bed? You can use the clock to help you.

Ⓐ 7:15 P.M.
Ⓑ 7:22 P.M.
Ⓒ 7:52 P.M.
Ⓓ 8:15 P.M.

WORK SPACE

6. Part A

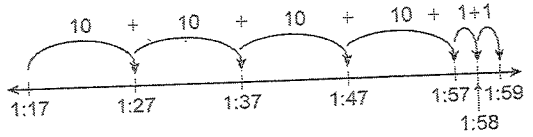
Steven started working in his garden at 1:17 P.M. He finished working at 1:59 P.M. How can you figure out how long Steven worked in his garden?

Sample answer: I need to find the difference between the start time and the end time.

Part B

Draw a number line to represent how long Steven worked in the garden. Solve the problem. Explain your answer.

Sample answer:



Steven worked for 42 minutes in his garden. I drew a number line to count from the start time to the end time. I drew jumps of tens and ones. I wrote the number of minutes and added the minutes together.

WORK SPACE

7. Sandy woke up 15 minutes before midnight. She had a cup of hot chocolate and went back to sleep 30 minutes later. What time did Sandy wake up? What time did she go back to sleep? Use A.M. or P.M. for each time. Explain your answer.

Sample answer: Sandy woke up at 11:45 P.M. and went back to sleep at 12:15 A.M. Midnight is 12:00. Fifteen minutes before the hour is the same as 45 minutes after the previous hour. I count on 30 minutes from 11:45. 11:45 plus 15 minutes is midnight, or 12:00. 12:00 plus 15 minutes is 12:15. The times after noon and before midnight are written with P.M. The times after midnight and before noon are written with A.M. So, Sandy woke up at 11:45 P.M. and went back to sleep at 12:15 A.M.

EXIT TICKET

3.MD.1

Now that you have mastered solving addition and subtraction problems with time, let's solve the problem in the Real-World Connection.

Andy got home from school at 3:35 P.M. It took him 10 minutes to eat a snack and 5 minutes to change clothes. Then, it took him 15 minutes to ride his bike back to school. At what time did he arrive at school for running practice?

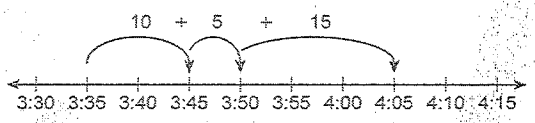
4:05 P.M.

Sample answer: School is out at 3:35 P.M.

It takes him 30 minutes from when he leaves school to when he gets back to school:

10 minutes to snack + 5 minutes to change + 15 minutes to ride back = 30 minutes.

From 3:35 to 4:00 is 25 minutes, so Andy arrives 5 minutes after 4:00, or 4:05 P.M.



GUIDED INSTRUCTION

1. Which estimated mass would a safety pin be likely to have:
   1 g, 10 g, 100 g, or 1 kg?

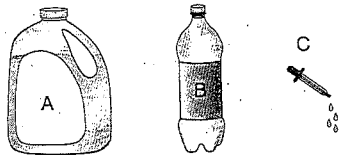
   Compare similar objects. Remember that a paper clip has a mass of about 1 g and a school book has a mass of about 1 kg.

   A safety pin is close to the size of a paper clip, so its mass is probably close to 1 gram.

HINT, HINT

One liter is very close to $\frac{1}{4}$ of a gallon. So, 4 liters of milk would fill a 1-gallon container.

2. Which of these containers would most likely have a liquid volume of about 1 L?



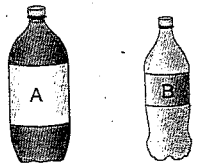
Think about what might be equal to 1 L.

The eyedropper is too small.

The large container is too big.

Container [B] is the best choice.

3. Bottle B has a volume of 1 liter. What is the best estimate of the volume of Bottle A:
   1 liter, 2 liters, 5 liters, or 10 liters?



Compare Bottle A to Bottle B.

Bottle A looks larger than Bottle B, but not 5 times as large.

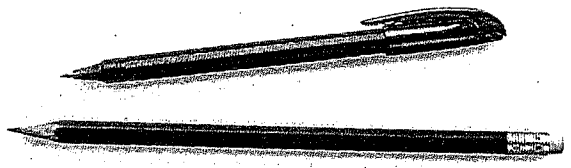
So, Bottle A probably holds about [2] L.

4. A pencil has a mass of 5 grams. Select the TWO closest estimates for the mass of a pen.

   (A) 1 g
   (B) 5 g
   (C) 7 g
   (D) 10 g
   (E) 20 g

TIPS AND TRICKS

The answers that are closest to the mass of a pencil will most likely be correct.



TURN AND TALK

Discuss with a partner. Suppose you have two empty containers. Could it be possible to estimate which container has the greater volume only by looking at it? Explain.

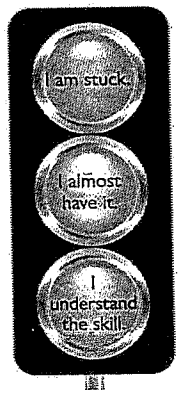
How Am I Doing?

What questions do you have?

Identify some objects in the classroom or at home that have a mass close to 1 g or 1 kg.

What is an example of something that has a mass of about 50 kg? How many grams do you think a potato weighs?

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



INDEPENDENT PRACTICE

WORK SPACE

Answer the questions.

1. The cup measures liters.

How many liters of water are in the cup?
Write your answer in the box.

0.5 L

2. The image below shows the volume of water in a measuring cup.

How many liters are in the measuring cup?

Ⓐ $\frac{1}{4}$
Ⓑ $\frac{1}{2}$
Ⓒ $1\frac{1}{2}$
Ⓓ 2

WORK SPACE

3. A peanut butter sandwich made with 2 slices of bread has a mass of 80 g. Which is the BEST estimate for the mass of 1 slice of bread?

(A) 10 g
(B) 10 kg
(C) 35 g
(D) 35 kg

4. Select the THREE objects that would MOST LIKELY weigh 10 kg.

(A) bag of groceries
(B) necklace
(C) chair
(D) watermelon
(E) keys

5. Which would be the BEST estimate of a crayon's mass?

(A) 3 g
(B) 30 g
(C) 3 kg
(D) 30 kg

6. Which object has a mass close to 1 kilogram?

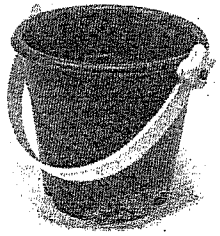
(A) a peanut
(B) a bottle cap
(C) a pen
(D) a kitten

TIPS AND TRICKS

Cover the answer choices. Think about an object that has a mass of 1 kilogram. Then uncover the answer choices. Which objects are closest in weight to the object you thought of?

7. A small beach pail holds about 1 liter of water. Which object holds less than 1 liter?

(A) a tea cup
(B) a bathtub
(C) a pool
(D) a water cooler



WORK SPACE

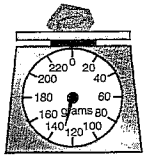
▶ THINK ABOUT IT

The pointer is between which two numbers?

WORK SPACE

8. Part A

The scale shows the measure of a rock. What is the mass of the rock?



130 grams

Part B

The rock is removed from the scale and another object replaces it. The mass remains the same. The rock was replaced by either a feather, a ladybug, a banana, or a fish tank. Which object likely replaced the rock? Explain your answer.

Sample answer: I would expect the banana to have replaced the rock. A banana might have a mass of about 125 g. A feather and ladybug would be very light and would be about 1 g. A fish tank would be very heavy and would be more than 1 kg.

EXIT TICKET

3.MD.2

Now that you have mastered estimating with grams, kilograms, and liters, let's solve the problem in the Real-World Connection.

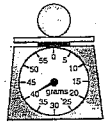
Sami said she ate a fruit that had a mass of about 12 grams. An apple has a mass of about 100 grams. A grape has a mass of about 5 grams. Simon guessed that Sami ate a blueberry. Jenny guessed that Sami ate a strawberry. Who is most likely correct? Compare the mass of the fruits. List the fruits in order from smallest to largest. Then, answer the question.

Sample answer: The mass of each fruit can be compared in order of size and mass: blueberry, grape, strawberry, apple.
Sami probably ate a strawberry since the fruit she ate has a mass of 12 grams. The fruit had to be larger than a grape and smaller than an apple.

THINK ABOUT IT

About how many golf balls do you think it would take to have a mass of 1 kg?

2. What is the mass of the golf ball?

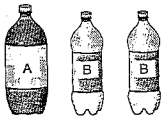


The scale measures in grams.

The pointer is at the number 40.

So, the mass of the golf ball is 40 grams.

3. Bottle A has a volume of 2 liters. Each Bottle B has a volume of 1 liter. What is the volume of all 3 bottles together?



Use addition to solve the problem.

$2 + 1 + 1 =$ 4

The combined volume of the three bottle is 4 liters.

HINT, HINT

There is a total of 80 g that needs to be split up among 8 marbles. How could you show that?

4. The combined mass of 8 marbles is 80 grams. Each marble has the same mass. Select the expression you can use to find the mass of each marble.

Ⓐ 80×8

Ⓑ $80 + 8 + 8 + 8 + 8 + 8 + 8 + 8 + 8 + 8$

Ⓒ $80 \div 8$

Ⓓ $80 + 8$

How Am I Doing?

What questions do you have?

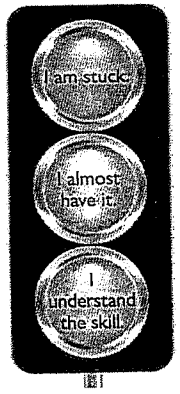
How can you add or multiply with grams, kilograms, or liters?

What is an example of a situation where you would need to add the mass of several objects? Explain.

TURN AND TALK

Work with a partner. A marble has a mass of 45 grams. Sam has two marbles. What is the total mass of Sam's marbles?

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



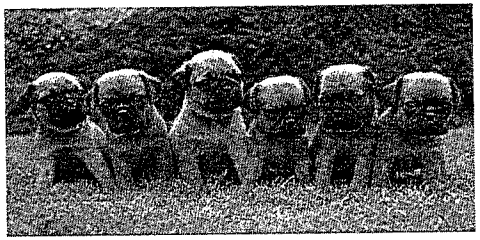
INDEPENDENT PRACTICE

Answer the questions.

TIPS AND TRICKS

Look for key words in the problem, such as "combined" and "each." Which operations should you use to solve the problem?

1. Each puppy in the litter weighed 2 kilograms at birth. What was the combined mass of the puppies?

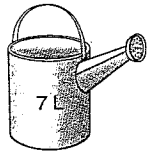


Ⓐ 6 kilograms
Ⓑ 8 kilograms
Ⓒ 12 kilograms
Ⓓ 14 kilograms

SKETCH IT

Draw a picture in the space below to help you visualize how many liters are in the watering can.

2. Anna has a watering can that is full of water. She uses 5 liters to water her garden. Then she adds 2 liters.



How many liters are now in the watering can?

Ⓐ 0
Ⓑ 4
Ⓒ 7
Ⓓ 14

3. Select TWO objects that have a mass that is less than 1 kilogram.

WORK SPACE

Ⓐ A car
Ⓑ A ruler
Ⓒ An apple
Ⓓ A brick
Ⓔ A refrigerator

4. A slice of bread has a mass of 15 grams. Which BEST describes the mass of a loaf of bread?

Ⓐ About 5 grams
Ⓑ About 5 kilograms
Ⓒ About 500 grams
Ⓓ About 500 kilograms

5. Part A

A carrot has a mass of 50 grams. A grape has a mass of 12 grams. How much more does the carrot weigh than the grape? Write your answer in the box.

38 grams

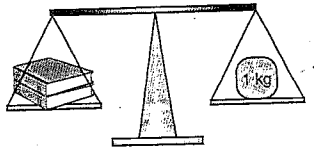
Part B

A bag has 8 carrots in it. Would you expect the mass of the carrots to be more or less than 1 kilogram? Explain your answer.

Sample answer: I would expect the mass of the bag of carrots to be less than 1 kilogram, because each carrot weighs 50 grams and 50 + 50 + 50 + 50 + 50 + 50 + 50 + 50 = 400. A kilogram is the same as 1,000 grams and 400 < 1,000.

WORK SPACE

6. The scale is balanced so each side has the same weight.



How would the scale change if a third book is added to the left side?

Explain your reasoning.

Sample answer: The scale would no longer be balanced, because the 3 books would be heavier than 1 kilogram.

7. Use the masses in the box to answer the word problems. The answers cannot be used more than once. Write each answer in the correct box.

48 grams	55 grams	1,000 grams	1,027 grams

There are 6 blocks. Each block has a mass of 8 grams. What is the total mass of the blocks? — 48 grams

A can of soup has a mass of 250 grams. Savannah's mom makes 4 cans of soup. What is the total mass of soup? — 1,000 grams

A bag of trail mix has a mass of 150 grams. Matt ate 95 grams of trail mix. How much is left? — 55 grams

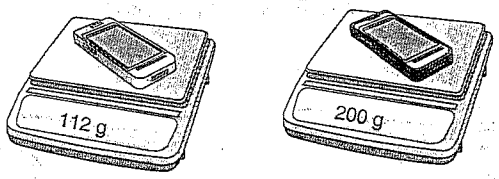
Mark's book bag weighs 612 grams. He adds a book that weighs 415 grams. How much does his book bag weigh? — 1,027 grams

EXIT TICKET

3.MD.2

Now that you have mastered solving problems with grams, kilograms, and liters, let's solve the problem in the Real-World Connection.

Lori weighs her smartphone with its case. Then she weighs her smartphone without its case. What is the mass of the smartphone case? Explain your answer.



The mass of the smartphone case is 88 grams.

Sample answer: The smartphone plus the case = 200 g and the smartphone has a mass of 112 g.
So, 112 g + the case = 200 g.
Subtract to find the mass of the case:
200 − 112 = 88
I can check the answer: 112 + 88 = 200

SKETCH IT

In the space below draw a picture graph of the table using a key of 1 badge picture = 2 badges. Then compare it to the statements listed in the question to see which ones are correct.

2. The table shows the number of badges earned by girls in a scout troop.

Scout	Number of Badges
Ella	9
India	11
Jessi	3
Lily	10
Nira	1
Sara	4

The data from the table is shown in a picture graph with a key of 1 badge picture = 2 badges. Select THREE statements about the picture graph that are true.

Ⓐ The row for India will show 11 badge pictures.

Ⓑ The row for Sara will show only whole-badge pictures.

Ⓒ The row for Nira will show half-badge and whole-badge pictures.

Ⓓ The row for Ella will show 4 whole-badge pictures and 1 half-badge picture.

Ⓔ The row for Jessi will show 1 whole-badge picture and 1 half-badge picture.

How Am I Doing?

What questions do you have?

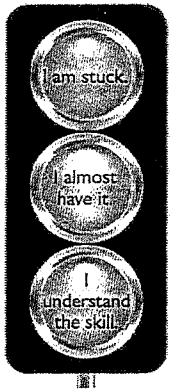
How do you determine the scale for a graph?

Which do you prefer; a picture graph or a bar graph? Explain your choice.

TURN AND TALK

Survey your classmates to find out their favorite colors. Then make a picture graph showing the data. Use your own paper for the graph.

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



INDEPENDENT PRACTICE

Answer the questions.

1. Gianna wants to make a bar graph showing the number of summer birthdays in the third-grade class. She collected data about the number of birthdays in each summer month. Gianna will show the information from the table in the bar graph.

Month	Number of Birthdays
June	6
July	12
August	9

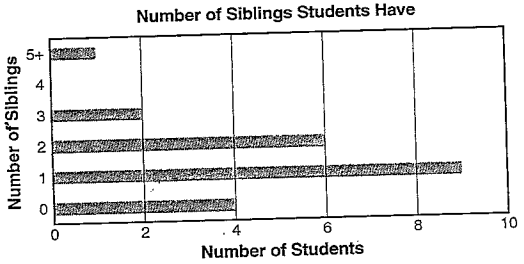
TIPS AND TRICKS

Read each statement and decide whether it is true based on the data in the graph. If it is not true, cross out this choice.

Which statement about Gianna's bar graph is true?

Ⓐ The bars for June and August are the same height.
Ⓑ The bar for August is the shortest bar on the graph.
Ⓒ The bar for July is the tallest bar on the graph.
Ⓓ The bar for August is twice as tall as the bar for June.

2. The graph below shows the number of siblings students have.



The same data is shown in a picture graph with a key of 1 symbol = 2 students. How many categories have more than 2 whole symbols?
Write your answer in the box.

2 categories

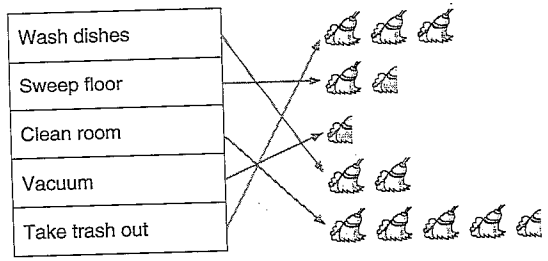
3. The table shows the number of students who have to do each chore.

WORK SPACE

Chore	Number of Students
Wash dishes	8
Sweep floor	6
Clean room	18
Vacuum	2
Take out trash	12

Show the data in a picture graph. Each symbol in the graph will mean 4 students.

Draw a line from each chore to the symbols that will show it on the picture graph.



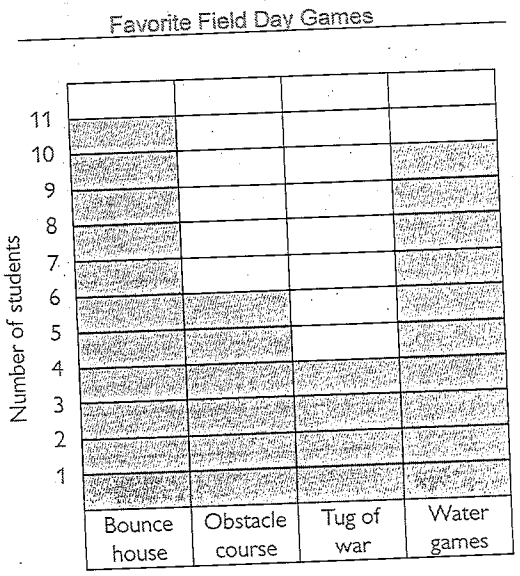
WORK SPACE

4. Students voted for their favorite games at field day. The results are shown below.

Favorite Field Day Games

Bounce house	𝍸 𝍸 I
Obstacle course	𝍸 I
Tug of war	IIII
Water games	𝍸 𝍸

Use the data in the table to create a bar graph. Make sure to label the bar graph and shade in the bars.



5. Part A

The data shows the number of magazines at a school library.

Type of Magazine	Number
Sports	4
Puzzle	6
Science	4
Craft	8

Use the symbol of the magazine shown in the key to make a picture graph showing the data in the table.

Magazines at the Library	
Type of Magazine	Number of Magazines
Sports	
Puzzle	
Science	
Craft	

Key: Each = 2 magazines

Part B

How would the graph be different if the key were 1 symbol = 4 magazines? Explain your answer.

Sample answer: The graph would be different because each row would have a different number of symbols. Sports would have 1 symbol. Puzzle would have 1 whole symbol and 1 half symbol. Science would have 1 symbol. Craft would have 2 symbols.

TIPS AND TRICKS

If you are stuck, try making this new graph. Would it look different than the first picture graph?

WORK SPACE

6. Part A

The data from the tally chart is made into a picture graph. The graph shows the number of sunny days each month.

Sunny Days Each Month

January	𝍸 𝍸 ||||
February	𝍸 |
March	𝍸 𝍸 𝍸
April	𝍸 𝍸 𝍸 |||
May	𝍸 𝍸 𝍸 𝍸 ||||

Month	Number of Sunny Days
January	☼ ☼
February	☼
March	☼ ☼ ☼
April	☼ ☼ ☼
May	☼ ☼ ☼ ☼

Select THREE parts that are missing from the picture graph.

- (A) Title
- (B) Category labels
- (C) Scale
- (D) Key

Part B

What should the key for the picture graph say? Explain how you know.

Sample answer: The key should say each sun equals 6 days. February had 6 sunny days, and there is only 1 sun pictured.

EXIT TICKET

3.MD.3

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

The school librarian knows that third-grade students checked out 12 fantasy books, 3 biography books, 6 science books, and 9 mystery books. Help her figure out the most popular books for third graders.

Create a picture graph. Remember to include a key and a title.

Sample answer:

Favorite Type of Book

Book Type	Number of Check Outs
Fantasy	📖 📖 📖 📖
Biography	📖
Science	📖 📖
Mystery	📖 📖 📖

Key: Each 📖 = 3 books

TURN AND TALK

Think about the problem from the beginning of the lesson. What operation is needed to solve the problem? How do you know?

Step One Use the graph to find the number of each type of fruit sold.

According to the graph, 14 apples, 18 bananas, 6 pears, and 10 peaches were sold.

Step Two Add to find the total.

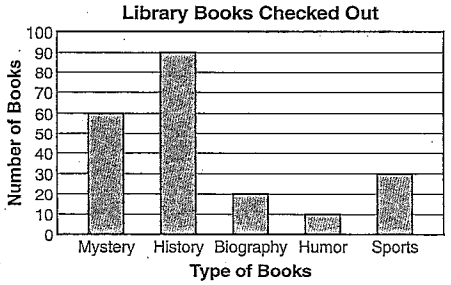
14 + 18 + 6 + 10 = 48 pieces of fruit

GUIDED INSTRUCTION

SKETCH IT

To check your work for the difference between sports books and humor books, draw the bar for sports over the bar for humor in the graph. See how many bar lines are covered by sports and not humor.

Use the bar graph to answer the questions that follow.



1. How many more sports books were checked out than humor books?

Step One Find the number of each type of book in the graph.

There were 30 sports books checked out. There were 10 humor books checked out.

Step Two Find the difference.

30 − 10 = 20

So, 20 more sports books were checked out than humor books.

2. How many more mystery books and history books were checked out than biography books and sports books?

Step One Find the number of mystery books and history books in the graph.

There were 60 mystery books and 90 history books checked out.

Step Two Find the sum.

60 + 90 = 150

Step Three Find the number of biography books and sports books in the graph.

There were 20 biography books and 30 sports books checked out.

Step Four Find the sum.

20 + 30 = [50]

Step Five Subtract the total number of biography books and sports books from the total number of mystery books and history books.

150 − 50 = [100]

So, [100] more mystery and history books were checked out.

3. Find the difference between the greatest and least numbers of books.

Find the greatest and the least numbers in the graph.

The tallest bar (history books) represents the greatest number.

The shortest bar ([humor] books) represents the least number.

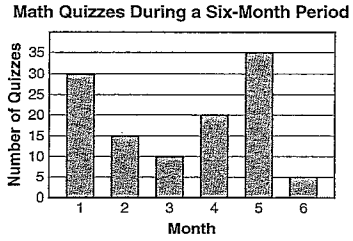
Subtract the least number from the greatest number to find the answer.

[90] − 10 = [80] more history books were checked out than humor books.

HINT, HINT

Check each month. The first step is to find out how many quizzes were in Month 2, for example: There were 15 quizzes in Month 2. There were 10 quizzes in Month 3. There were fewer quizzes in Month 3 than there were in Month 2, so choice B is not correct.

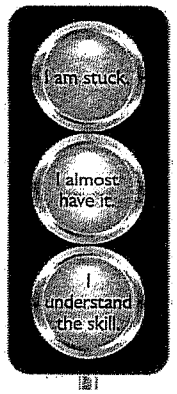
4. The graph shows the number of math quizzes students had during a six-month period.



During which months were there at least 10 more math quizzes than there were during Month 2? Select TWO correct answers.

Ⓐ Month 1
Ⓑ Month 3
Ⓒ Month 4
Ⓓ Month 5
Ⓔ Month 6

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



How Am I Doing?

What questions do you have?

How do you determine the interval of a bar graph?

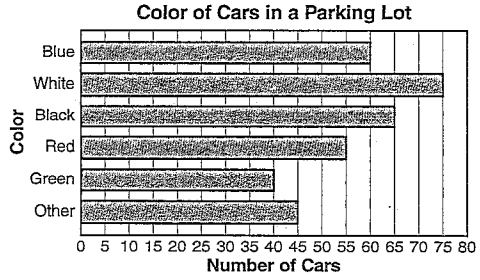
How do you determine which operation to use to solve the problem?

INDEPENDENT PRACTICE

WORK SPACE

Answer the questions.

1. The graph shows the colors of cars in a parking lot.



Write answers in the boxes to make each statement true.

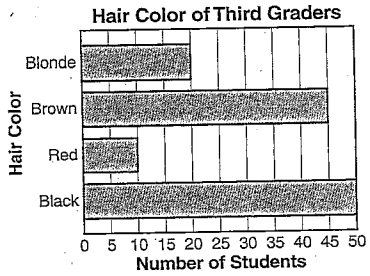
There are [15 more] white cars than blue cars.

The total number of white cars and green cars is equal to the total number of [red] and [blue] cars.

TIPS AND TRICKS

Remember to use the scale of the graph to find the value for each bar.

2. The graph shows the hair colors of third graders at an elementary school.



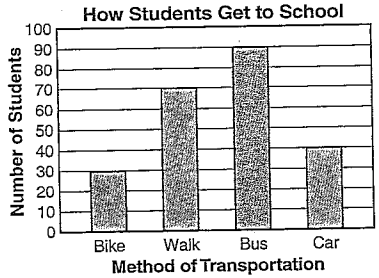
How many more students have brown or black hair than blonde or red hair? Write your answer in the box.

65 students

TIPS AND TRICKS

On a computer-based test, you may see items that ask you to drag objects into the correct order.

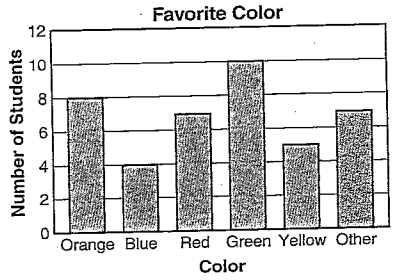
3. The graph shows how students get to school.



How many students combined take the bus or a car to school?

Ⓐ 90
Ⓑ 110
Ⓒ 160
Ⓓ 130

4. The graph shows the favorite colors of a group of students.

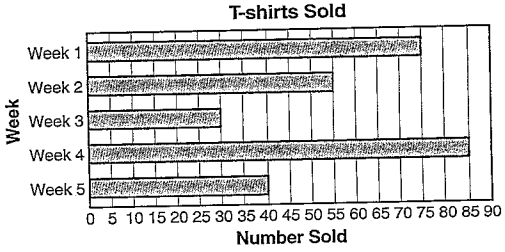


How many students in all chose the two most popular colors?

Ⓐ 9
Ⓑ 15
Ⓒ 17
Ⓓ 18

WORK SPACE

5. The graph shows the number of T-shirts sold over 5 weeks.

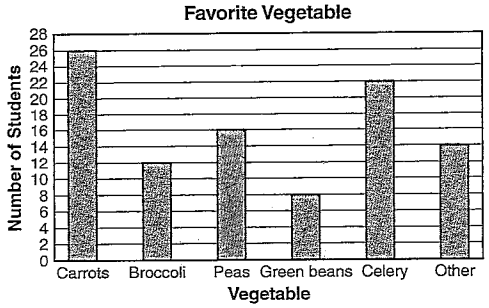


How many T-shirts were sold over 5 weeks? Write your answer in the box.

285 T-shirts

WORK SPACE

6. The graph shows the favorite vegetables of third graders.

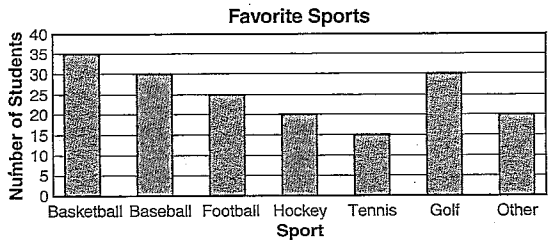


How many more students chose carrots and celery than broccoli and green beans?

Ⓐ 14 Ⓑ 28

Ⓒ 36 Ⓓ 68

7. The graph shows the favorite sports of some students.



Which totals are greater than the total number of students who chose baseball or football? Select THREE correct answers.

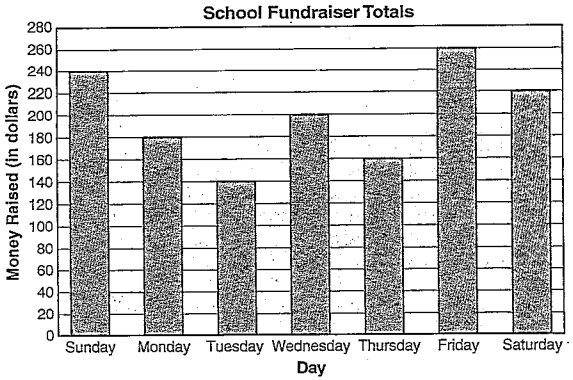
Ⓐ basketball and golf Ⓑ baseball and basketball

Ⓒ hockey and golf Ⓓ football and golf

Ⓔ baseball and golf

8. Part A

The graph shows the amount of money raised during a school fundraiser.



How much more money was raised on Friday and Saturday than on Tuesday and Wednesday?

Write your answer in the box.

$ 140

Part B

Explain the steps you used to find your answer.

Sample answer: First, I added 260 and 220 to get the total for Friday and Saturday, 480. Next, I added 140 and 200 to get the total for Tuesday and Wednesday, 340. Then, I subtracted 340 from 480 to get the answer of 140.

TIPS AND TRICKS

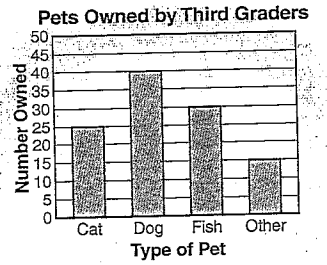
How did you solve the problem? Break your answer into steps. Describe each step.

EXIT TICKET

3.MD.3

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

Sol made this bar graph that shows what kind of pets his classmates have.



How many more third graders own a cat, dog, or fish than own any other type of pet? Explain how you know.

Sample answer: 80 more third graders at Sol's school own a cat, dog, or fish than any other type of pet.

The third graders own 25 cats, 40 dogs, 30 fish, and 15 other pets.

Add to find the total number of cats, dogs, and fish:

$25 + 40 + 30 = 95$.

Subtract the number of other pets from the total number of cats, dogs, and fish: $95 - 15 = 80$.

Vocabulary in Action

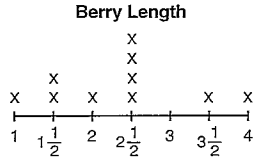
- A graph is a way to organize and show information. The information in a graph is also called data.
- A line plot is a type of graph.
  - A line plot shows you how many of each number is in a set of data.
  - A line plot is a number line with Xs or dots above the numbers. The Xs or dots show how many times the number appears.

TALK ABOUT IT

What other information can you gather from the line plot? How can you tell how many values are in the data set?

EXAMPLE

The line plot shows the lengths of some berries.



How many berries are $1\frac{1}{2}$ inch long?

Count the number of Xs above $1\frac{1}{2}$. There are two Xs.

Two berries are $1\frac{1}{2}$ inches long.

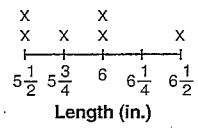
TURN AND TALK

Think about the other set of data. What would the line plot look like for that set? Draw a line plot to show that data.

EXAMPLE

Which set of data matches the line plot?

Set A: $5\frac{3}{4}$, 6, $6\frac{1}{2}$, $5\frac{1}{2}$, $6\frac{1}{4}$, $5\frac{1}{2}$ **Set B:** 6, $6\frac{1}{2}$, $5\frac{3}{4}$, $5\frac{1}{2}$, 6, $5\frac{1}{2}$



List the values in each set from least to greatest.

Set A: $5\frac{1}{2}$, $5\frac{1}{2}$, $5\frac{3}{4}$, 6, $6\frac{1}{4}$, $6\frac{1}{2}$ **Set B:** $5\frac{1}{2}$, $5\frac{1}{2}$, $5\frac{3}{4}$, 6, 6, $6\frac{1}{2}$

Compare the data values to the Xs in the line plot.

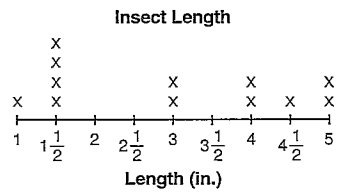
The line plot shows two Xs above $5\frac{1}{2}$, one X above $5\frac{3}{4}$, two Xs above 6, and one X above $6\frac{1}{2}$. These are the data values in Set B.

Set B matches the line plot.

GUIDED INSTRUCTION

1. The line plot shows the lengths of 12 insects.

   Use the line plot to find the set of data.



Find the number of values in the set.

Each value in a line plot is represented with an X. Count the number of Xs.

There are [12] values in the set.

A line plot shows all the possible measurements between the least and greatest value. The measurements without Xs will not appear in the set of data.

Which lengths will not appear in the set of data?

2. [$2\frac{1}{2}$] [$3\frac{1}{2}$]

List the data from least to greatest.

The length of the insects in inches are:

1, $1\frac{1}{2}$, $1\frac{1}{2}$, $1\frac{1}{2}$, $1\frac{1}{2}$

3, 3, 4, 4, $4\frac{1}{2}$

5, and 5

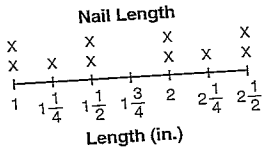
TIPS AND TRICKS

To solve the problem, compare the data in the list to the data in the line plot. Cross out each number in the list that is on the plot. The leftover points are the ones Marco needs to add.

2. Marco measured the length of each nail in his toolbox. He made a chart of the data. The measurements are in inches.

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

Then he made a line plot for the data.



Select TWO values that Marco needs to add to his line plot.

Ⓐ 1

Ⓑ $1\frac{1}{4}$

Ⓒ $1\frac{3}{4}$

Ⓓ 2

Ⓔ $2\frac{1}{2}$

How Am I Doing?

What questions do you have?

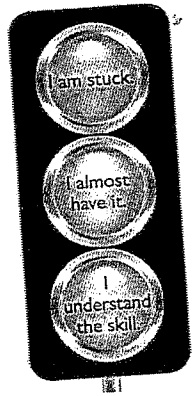
What could you measure in the classroom to collect data for a line plot?

What if you measured each person's shoe size? Explain how this data would be shown in a line plot. How many Xs would there be? What numbers would be on the number line?

TURN AND TALK

Work with a partner. Measure the length of five objects in your classroom to the nearest half inch. Record each object and its measurement. Then make a line plot showing the measurements.

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

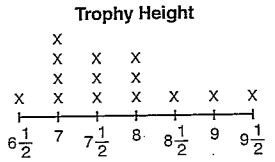


WORK SPACE

INDEPENDENT PRACTICE

Answer the questions.

1. Maria measured the height of each trophy on her shelf. She made a line plot of the data.



Which statement is true?

Ⓐ 2 trophies are exactly 9 inches high.

Ⓑ 1 trophy is exactly $6\frac{1}{2}$ inches high.

Ⓒ 0 trophies are exactly $8\frac{1}{2}$ inches high.

Ⓓ 3 trophies are exactly 7 inches high.

2. Donna measured the length of each screwdriver in her toolbox. The measurements are in inches.

$16\frac{1}{2}$ 15 $17\frac{1}{2}$ 18 15 17 $17\frac{1}{2}$ $17\frac{1}{2}$ 17 18

She will use the data to create a line plot. Which length will have the greatest number of Xs stacked above it? Write your answer in the box.

$17\frac{1}{2}$ inches

3. José went to the museum. He measured the length of each beetle that was preserved in a display. The measurements are in inches.

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

He is making a line plot of the data. Which length will have no Xs above it? Write your answer in the box.

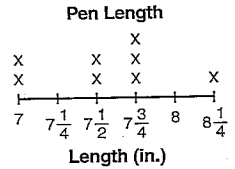
$2\frac{1}{2}$ inches

HINT, HINT

Think of how a line plot is designed. How is it like a ruler? What numbers should be on the number line?

4. Part A

Victoria measured the length of each pen in her school bag. She used a line plot to display the data.



Which set of data matches the line plot?

Ⓐ $7\frac{3}{4}$, 7, $7\frac{1}{2}$, $7\frac{1}{2}$, $8\frac{1}{4}$, $7\frac{3}{4}$, 7, $7\frac{3}{4}$

Ⓑ $7\frac{1}{4}$, 7, $7\frac{1}{2}$, $7\frac{1}{2}$, $8\frac{1}{4}$, $7\frac{3}{4}$, 7, 8

Ⓒ $7\frac{1}{4}$, 7, $7\frac{1}{2}$, $7\frac{3}{2}$, $8\frac{1}{4}$, 8

Ⓓ $7\frac{3}{4}$, 7, $7\frac{1}{4}$, $7\frac{1}{2}$, $7\frac{1}{2}$, $8\frac{1}{4}$, $7\frac{3}{4}$, 7, $7\frac{3}{4}$, 8

Part B

Doug says 8 inches is a value in the data set because it is shown on the line plot. Is he correct? Explain how you know.

Sample answer: He is not correct because there are no Xs above it.

TIPS AND TRICKS

On a computer-based test, you may see items that ask you to drag objects into the correct place.

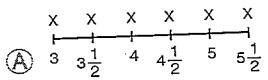
WORK SPACE

5. Erin measured the length of some leaves she found in her backyard. She made a chart of the data. The measurements are in inches.

$3\frac{1}{2}$	4	3	5	$4\frac{1}{2}$	4	4	$3\frac{1}{2}$	5	$5\frac{1}{2}$

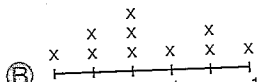
Which line plot matches Erin's data?

Ⓐ



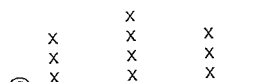
Length (in.)

Ⓑ



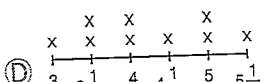
Length (in.)

Ⓒ



Length (in.)

Ⓓ



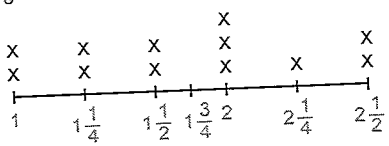
Length (in.)

WORK SPACE

6. Ray measured the length of each key on his key ring. He recorded the lengths in a chart. The measurements are in inches.

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

Then he made a line plot of the data. He is about to write the lengths on the line plot scale.



Write each number under the tick mark where it belongs.

7. Ruth measured the length of each eraser in her desk. She made a chart of the data. The measurements are in inches.

$3\frac{1}{4}$	$2\frac{1}{4}$	4	3	$1\frac{1}{2}$	$3\frac{1}{2}$	2	$1\frac{1}{2}$	3	$2\frac{1}{4}$	$2\frac{1}{2}$	3

She wants to make a line plot for the data. Which lengths will have at least 2 Xs? Select THREE correct answers.

Ⓐ $1\frac{1}{2}$

Ⓑ 2

Ⓒ $2\frac{1}{4}$

Ⓓ $2\frac{1}{2}$

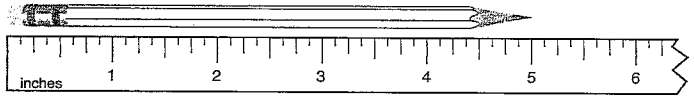
Ⓔ 3

EXIT TICKET

3.MD.4

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

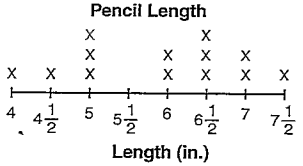
The students in Rosa's class are learning about measuring length in inches. Each student measures a pencil. Each length is recorded on a line plot. Rosa also measured her pencil, which is shown below. Where should she place her X on the line plot?



Use the ruler to find the length of Rosa's pencil.

Rosa's pencil is 5 inches long.

Explain what the line plot shows and where Rosa should place her X.

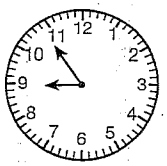


Sample answer: The line plot shows the lengths of pencils in inches. Each X represents a pencil. Rosa should add an X above the 5 because her pencil is 5 inches long.

PRACTICE TEST

Answer the questions.

1. What time is shown on the clock? Write your answer in the boxes.



8 : 54

2. Part A

When Katie finishes reading, the hour hand is between the 7 and the 8. The minute hand is on the 11. What time does Katie finish reading?

Katie finishes reading at 7:55.

Part B

Tom finishes reading 19 minutes after Katie. What time does Tom finish reading? Explain how you found your answer.

Sample answer: Tom finishes reading at 8:14.
I counted 3 fives and 4 ones from 7:55: 8:00, 8:05, 8:10, 8:11, 8:12, 8:13, 8:14.

3. The table shows the start and end times of two events at the library. What times complete the table?

Write your answers in the boxes.

Event	Start time	End time	Event length
Story time	11:25 A.M.	11:41 A.M.	16 minutes
Computer class	3:15 P.M.	3:47 P.M.	32 minutes

4. Quinn woke up at 7:40 A.M. It took him 10 minutes to get dressed, and 15 minutes to eat breakfast. Then it took him 3 minutes to pack his book bag and get ready for school.

What time will Quinn be ready to leave for school? You can use the clock to help you.

Ⓐ 7:58
Ⓑ 8:03
Ⓒ 8:08
Ⓓ 8:15

5. Jason has five objects with the following masses: 200 g, 4 kg, 1 kg, 30 g, and 500 g. Order the objects by mass from least to greatest. Write your answers in the chart below.

Order from Least to Greatest	Mass
1	30 g
2	200 g
3	500 g
4	1 kg
5	4 kg

6. Select THREE items that MOST LIKELY weigh 1 gram.

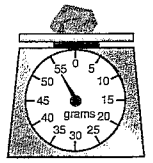
Ⓐ sugar packet
Ⓑ bag of apples
Ⓒ textbook
Ⓓ piece of gum
Ⓔ earring

7. There are 8 cartons of juice in each box. There are 32 liters of juice in a box. What is the volume of each carton of juice?

Write your answer in the box.

4 liters

8. The scale shows the mass of a rock.



How many grams is the mass of the rock?

Ⓐ 55
Ⓑ 50
Ⓒ 45
Ⓓ 40

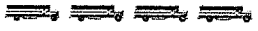
9. The table shows how many students voted for each field trip location.

Field Trip Choices	
Aquarium	10
Farm	6
Library	2
Theater	13
Zoo	9

Matt is going to create a picture graph from the data and use a bus as the symbol. Each bus will stand for 2 students.

Which group of symbols should Matt use to show the data for zoo?

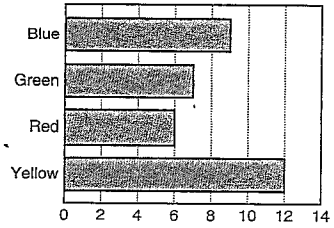
Ⓐ 

Ⓑ 

Ⓒ 

Ⓓ 

10. The students at a school are ordering school T-shirts. The graph shows how many students want each color shirt.



Select TWO items that are missing from this bar graph.

Ⓐ Category label

Ⓑ Data

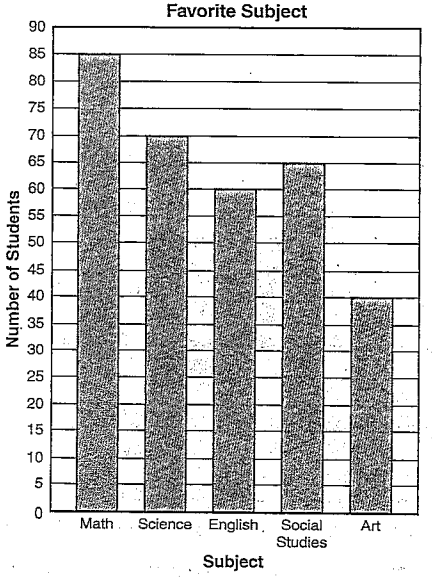
Ⓒ Scale label

Ⓓ Title

Ⓔ Scale

11. Part A

Some students were asked their favorite subject. The results are shown in the graph.



How many students were asked in all? Write your answer in the box.

320 students

Part B

If 15 students changed their answer from social studies to science, would your answer from Part A change? Explain why or why not.

Sample answer: No, my answer would not change. If 15 students changed their favorite subjects, the total number of students would still be the same.

12. Select TWO objects that have a mass that is more than 1 kilogram.

- (A) A pencil
- (B) A television
- (C) A car
- (D) A banana
- (E) A kitten

13. Lisa is going to meet her friend at a store at 11:00 A.M. She arrives 20 minutes early. When does Lisa arrive at the store?

Use A.M. or P.M. Write your answer in the box.

10:40 A.M.

14. Part A

Donna measured the heights of some figurines. The measurements are in inches.

$2\frac{1}{2}$ $1\frac{3}{4}$ 1 $1\frac{1}{2}$ $1\frac{1}{2}$ $1\frac{3}{4}$ $1\frac{1}{2}$ $2\frac{1}{2}$

She will use the data to create a line plot. Which height will have the greatest number of Xs? Write your answer in the box.

$1\frac{1}{2}$ inches

Part B

How many heights should Donna use to create the line plot scale? What are they? Explain how you know.

Sample answer: Donna should use 7 heights: 1, $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$, 2, $2\frac{1}{4}$, $2\frac{1}{2}$. She should include each height between 1 and $2\frac{1}{2}$ even if there is not a point for the height.

Vocabulary in Action

- A unit square is a square with 4 side lengths of 1 unit each.
  - A unit square can be used to find the area of a shape.
  - Area is how much space a shape covers.
  - The sides of a unit square are each 1 unit long, so its area is 1 square unit.

You can cover a shape with unit squares to find its area.

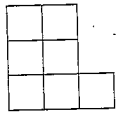
TURN AND TALK

What happens if there are gaps or overlaps when measuring the area of a shape?

EXAMPLE

When you cover the surface area of a shape, there must not be any gaps or overlaps.

The area of this shape is 7 square units.



☐ 1 square unit

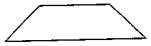
Sometimes you can break a unit square into equal parts to cover a shape.

SKETCH IT

Draw some different ways you could break apart a unit square. Outline a shape on grid paper that is made up of whole and half squares.

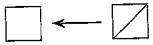
EXAMPLE

If you break 1 unit square into 2 triangles, you can cover the area of the shape without gaps or overlaps.



Step One Break the shape into unit squares and triangles.

Step Two Combine the triangles into units.

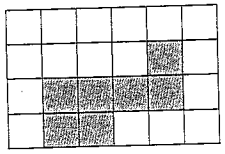


Step Three Count the units.

There were 2 unit squares, and the two triangles make another square, for a total of 3 units.

GUIDED INSTRUCTION

1. The shaded part of the grid shows the layout of a flower garden. Find the area of the garden.



☐ 1 square foot

Count each of the unit squares that are shaded.

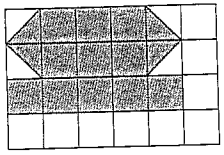
Each square on the grid is 1 square foot.

The area of the garden is [7] square feet.

THINK ABOUT IT

In Exercise 1, the unit square is 1 square foot. In Exercise 2, the unit square is 1 square inch. What happens to the area when the unit square changes?

2. Find the area of the shaded shape.



☐ 1 square in.

Step One Count each of the shaded squares that are full squares.

There are 11 full squares.

Step Two Count each triangle and convert to unit squares. Two triangles make 1 unit square.

There are [4] triangles, or [2] more unit squares.

Step Three Add the unit squares to find the total area. Include the units in your answer.

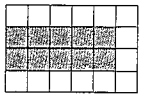
The area is [13 square in.]

HINT, HINT

Remember, 2 *triangles* are equal to 1 square ft.

3. Select THREE shaded shapes that have an area of 10 square feet.

☐ 1 square ft

Ⓐ 

Ⓑ 

Ⓒ 

Ⓓ 

Ⓔ 

How Am I Doing?

What questions do you have?

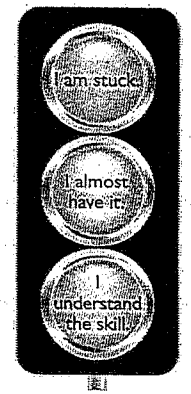
Look around the classroom. Where do you see square units?

Explain how you could use square units to find the area of a classroom object such as your desk or a book.

TURN AND TALK

Work in a small group. Use grid paper to design a floor plan. The design should include at least 5 rooms (living area, kitchen, bathroom, bedrooms, etc.), and should not be larger than 1,500 square feet. Label each room and write the measurements as well as the area for each room. Share your floor plan with another group.

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

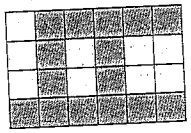


WORK SPACE

INDEPENDENT PRACTICE

Answer the questions.

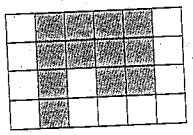
1. What is the area of the shaded shape?
   Write your answer in the box.



☐ 1 square m

15 square m

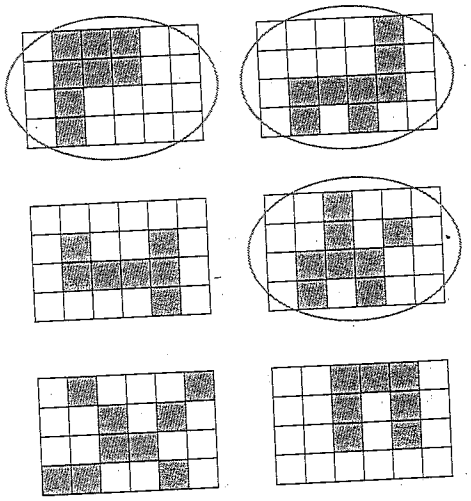
2. What is the area of the shaded shape?



☐ 1 square ft

Ⓐ 11 square ft
Ⓑ 12 square ft
Ⓒ 12 square in.
Ⓓ 18 square ft

3. Circle THREE shapes that have an area of 8 square units shaded.

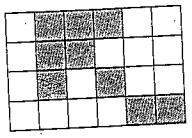


TIPS AND TRICKS

If this test was on a computer, you may be asked to select items by clicking on each shape.

WORK SPACE

4. Which number represents the area of the shaded shape?



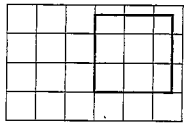
☐ 1 square in.

Ⓐ 22 square in.
Ⓑ 10 square in.
Ⓒ 9 square in.
Ⓓ 8 square in.

WORK SPACE

5. Part A

Marisa says that the shape has an area of 9 square units. Marisa is incorrect. Explain how you know the area of the shape cannot be 9 square units.

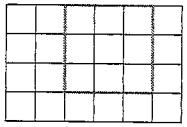


1 square unit

Sample answer: The area of the shape is less than 9 square units because the shape does not have 9 full unit squares.

Part B

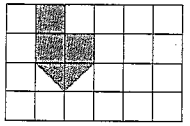
Draw lines on the grid to show a figure that has an area of 9 square units.



1 square unit

Sample drawing shown.

6. Use the shapes in the box to draw a shape on the grid that has an area of 4 square units. Shapes may be used more than once.



1 square unit

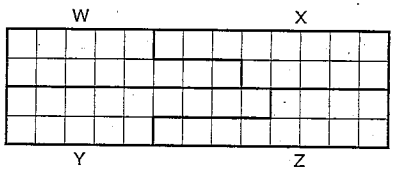
Sample drawing shown.

HINT, HINT

Each square on the grid has an area of 1 square unit. Each triangle has an area of $\frac{1}{2}$ square unit.

WORK SPACE

7. Which statement is true about each part of the shape.



1 square unit

(A) Shapes W and X have the same area.

(B) Shape W has a greater area than shape Y.

(C) The area of shape X is 12 square centimeters.

(D) Shape Z has the greatest area.

EXIT TICKET

3.MD.5, 3.MD.5a, 3.MD.5b, 3.MD.6

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

Gavin wants to cover part of a wall in his kitchen using peel and stick square tiles. Gavin needs to know how many peel and stick square tiles he needs to buy to cover part of the kitchen wall.

Part of Gavin's wall to cover

 Size of 1 square.

The number of tiles Gavin needs is equal to the area.

How many square tiles does Gavin need to buy? Explain how you found the answer.

Gavin needs to buy 5 small squares. I counted the number of square tiles it will take to cover the area of the wall. He needs 4 whole squares for the one part of the wall. Then if Gavin cuts 1 whole square into 2 halves, he can cover the top part of the wall with 1 whole square. 4 + 1 = 5. The area Gavin needs to cover is 5 square units.

INDEPENDENT PRACTICE

Answer the questions.

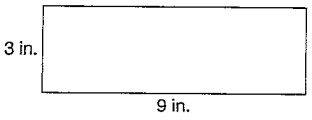
THINK ABOUT IT

You learned different ways to find area. You can use one method to find the answer and the other method to check your work.

WORK SPACE

1. What is the area of the shape?

   Ⓐ 12 square in.
   Ⓑ 21 square in.
   Ⓒ 24 square in.
   Ⓓ 27 square in.



2. Complete the equations that show the area of the rectangles. Write your answers in the boxes.

   6 m × [5] m = 30 square m

   3 m × 3 m = [9] square m

   [7] m × 3 m = 21 square m

   4 m × 2 m = [8] square m

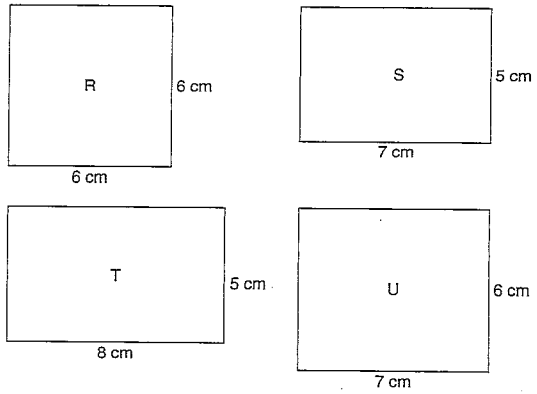
3. Delaney is painting a picture that has a width of 6 meters and a length of 7 meters. Write the number that will correctly complete the equation and sentence.

   7 × 6 = [42]

   The area is [42] square meters.

4. Review the area of each rectangle. Which statement is true?

WORK SPACE



   Ⓐ Rectangles R and S have the same area.
   Ⓑ Rectangle U has a greater area than rectangle S.
   Ⓒ Rectangle R has the least area.
   Ⓓ Rectangle T has the greatest area.

5. Select THREE rectangles that have an area of 24 square centimeters?

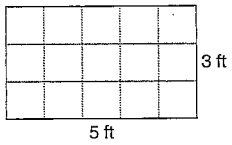
   Ⓐ 6 cm by 4 cm
   Ⓑ 2 cm by 6 cm
   Ⓒ 3 cm by 8 cm
   Ⓓ 4 cm by 9 cm
   Ⓔ 9 cm by 4 cm

TIPS AND TRICKS

If you see a question like this on a computer test, there may be a line tool to separate the figure to show the area.

Part A

Derek has a desk that is 3 feet by 5 feet. Draw lines to show the area of the desk.



Part B

Explain another way to find the area of the desk besides drawing lines and counting unit squares.

Sample answer: I could multiply the side lengths of 5 feet by 3 feet to find 15 square feet.

SKETCH IT

Make sure you understand what numbers are given and what the problem is asking you to find. Sometimes drawing a picture can be helpful.

7. **Part A**

Marco has a rectangular poster board that has an area of 16 square feet. One side length is 4 feet. What is the length of the other side?

Write your answer in the box.

4 feet

Part B

Explain how you found the length of the other side of Marco's poster.

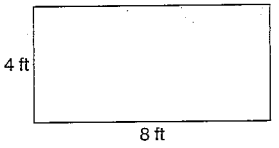
Sample answer: I can multiply side lengths to find the area of a rectangle. I used the multiplication fact $4 \times 4 = 16$. So the other side is also 4 feet.

EXIT TICKET

3.MD.7, 3.MD.7a, 3.MD.7b

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

For her vegetable garden, Tonya plans to make the garden 4 feet wide and 8 feet long. Tonya can use multiplication to find the area of her garden.



What will be the area of Tonya's garden?

Tonya's garden will be 32 square feet.

There are 4 rows and 8 squares in each row; or there are 8 columns and 4 squares in each column. Multiply to find the area.

$8 \times 4 = 32$

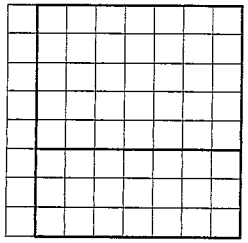
$4 \times 8 = 32$

TIPS AND TRICKS

Check your answers by counting the squares inside each rectangle.

3. Part A

Write equations to find the area of each rectangle.



☐ 1 square meter

Step One Find the side lengths of the top rectangle.

The top rectangle has sides that are 7 and 5 meters.

Step Two Multiply to find the area.

$7 \times 5 =$ 35

Step Three Find the side lengths of the bottom rectangle.

The bottom rectangle has sides that are 7 and 3 meters.

Step Four Find the area of the bottom rectangle.

$7 \times$ 3 $=$ 21

Part B

Write an equation that uses the side lengths of the rectangle to find the area of the figure.

Step One Write an equation for the total areas of the rectangles. Use the equations from Part A.

$7 \times (5 + 3) = (7 \times 5) + (7 \times 3)$

Step Two Find the area of each rectangle.

$7 \times (5 + 3) = (35) + (21)$

Step Three Add to find the total area.

$7 \times (5 + 3) =$ 56 square meters

How Am I Doing?

What questions do you have?

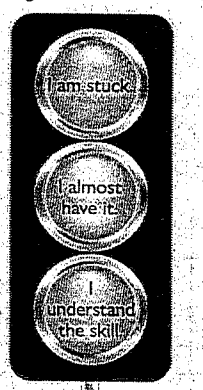
How can you find the area of a rectangle? How can you find the area of a complex figure by finding the area of the rectangles in it?

What is an example of a rectangle that you see or use every day? What is a complex figure that you see or use every day?

TURN AND TALK

Find a partner and together, look around the classroom. How could you find the area of your classroom? (Be sure to include entryways and closets.) Describe the steps you would need to take to find the area of the entire classroom.

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

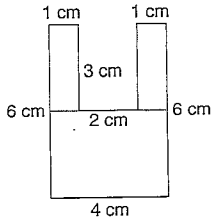


INDEPENDENT PRACTICE

Answer the questions.

1. Part A

Draw lines to divide the complex figure into rectangles.



Sample drawing shown.

TIPS AND TRICKS

Some questions might have more than one part. Review the information in Part A to help find the answer for Part B.

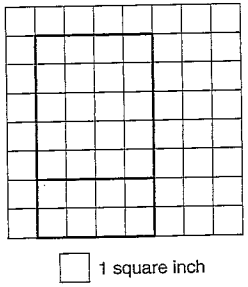
Part B

Complete the equations to find the area of the figure above. Write your answers in the boxes.

Sample answer:

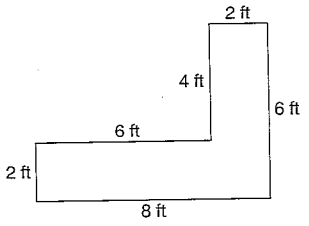
1	×	3	=	3		
1	×	3	=	3		
3	×	4	=	12		
3	+	3	+	12	=	18

2. Which equation represents the area of the figure?



Ⓐ $4 \times (4 + 2) = (4 \times 4) + (4 \times 2)$
Ⓑ $4 \times (5 + 2) = (4 \times 5) + (4 \times 2)$
Ⓒ $4 \times (6 + 1) = (4 \times 6) + (4 \times 1)$
Ⓓ $4 \times (7 + 2) = (4 \times 7) + (4 \times 2)$

3. What is the area of the shape below in square feet?



Ⓐ 26
Ⓑ 28
Ⓒ 22
Ⓓ 24

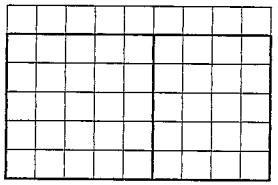
HINT, HINT

Decompose the figure into two rectangles. What are the dimensions of each rectangle?

WORK SPACE

4. What is the area of the figure?

Write your answer in the box. Include the equation you used.



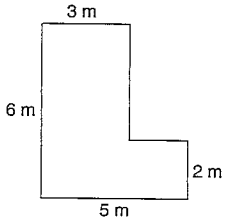
☐ 1 square meter

$5 \times (4 + 5) = (5 \times 4) + (5 \times 5)$

45 square meters

5. Rex is cutting a piece of carpet. What is the area of the carpet?

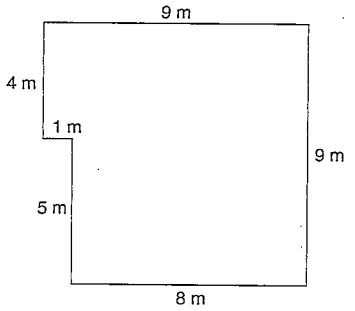
Write your answer in the box.



22 square meters

6. Part A

Yvonne wants to find the area of the deck. She says she can break apart the figure into one rectangle with side lengths of 5 and 8 meters and another rectangle with side lengths of 4 and 9 meters. Is she correct? Explain.



Sample answer: Yes, she is correct. Yvonne can draw a horizontal line to divide the figure. The top rectangle would have side lengths of 4 meters and 9 meters. The bottom rectangle would have side lengths of 5 meters and 8 meters.

Part B

Describe another way that Yvonne can find the area of the deck. Find the area and show your work.

Sample answer: Yvonne can draw a vertical line to divide the figure. One rectangle would have sides of 4 and 1. The other rectangle would have sides of 9 and 8. The area is $(4 \times 1) + (9 \times 8) = 76$ square meters.

TIPS AND TRICKS

Check that you answer all parts of the question. This question asks if someone's work is correct. It also asks you to explain.

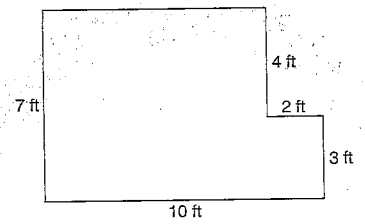
WORK SPACE

EXIT TICKET

3.MD.7, 3.MD.7c

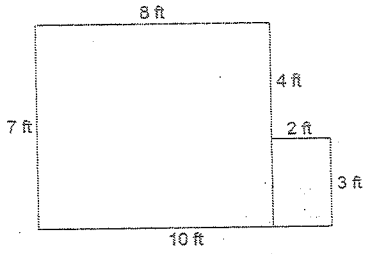
Now that you have mastered finding area by breaking a shape into rectangles, let's solve the problem in the Real-World Connection.

In Jessica's new lawn-mowing service, the amount she earns depends on the area of the lawn she mows. The figure below is the shape of Perry's lawn. What is the area of the lawn?



The area of Perry's lawn is 62 square feet.

Sample drawing shown.



Find the area of each rectangle.

$8 \times 7 = 56$

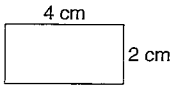
$2 \times 3 = 6$

Find the total area of the lawn by adding the area of the rectangles.

$56 + 6 = 62$

EXAMPLE

What is the perimeter of the rectangle?



Remember that a rectangle has two pairs of sides. Each pair is the same length. In this rectangle, two sides are 4 cm long and two sides are 2 cm long.

The perimeter is the sum of all of the sides.

$4 + 2 + 4 + 2 = 12$

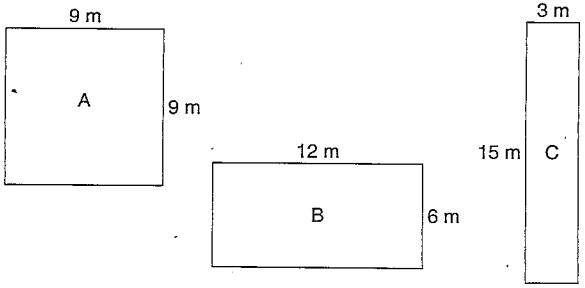
So, the perimeter of the rectangle is 12 cm.

GUIDED INSTRUCTION

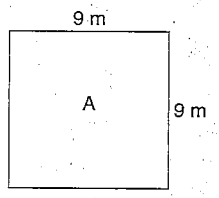
HINT, HINT

Start by finding the perimeter and area of each shape.

1. Alex is building a rectangular garden. He made three designs. Each design has the same perimeter. Which design should he use to create a garden with the greatest area?



Step One Find the perimeter and area for Design A.



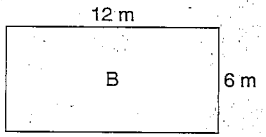
The perimeter of Design A is:

$9 + 9 + 9 + 9 = 36$ meters

The area of Design A is:

$9 \times 9 = 81$ 81 square meters

Step Two Find the perimeter and area for Design B.



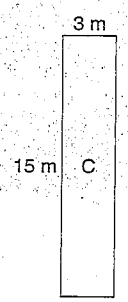
The perimeter of Design B is:

$12 + 6 + 12 + 6 =$ [36] meters

The area of Design B is:

$12 \times 6 =$ [72] square meters

Step Three Find the perimeter and area for Design C.



The perimeter of Design C is:

$15 + 3 + 15 + 3 = 36$ meters

The area of Design C is:

$15 \times$ [3] $=$ [45] square meters

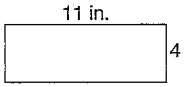
Step Four Solve the problem.

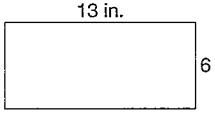
All the designs have the same perimeter. Design [A] has the greatest area.

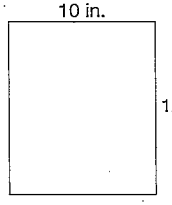
HINT, HINT

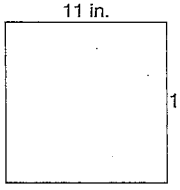
Perimeter is the distance around the shape. To find the perimeter, find the lengths of each side and add them together.

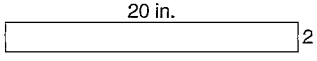
2. Nico framed a rectangular painting. The perimeter of the frame is 44 inches. Which of these frames could be the one Nico used? Select THREE correct answers.

Ⓐ 

Ⓑ 

Ⓒ 

Ⓓ 

Ⓔ 

How Am I Doing?

What questions do you have?

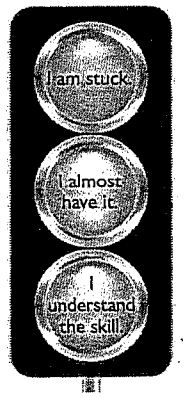
How is area different than perimeter?

How could knowing how to find perimeter help you in the real-world?

TURN AND TALK

With a partner, find the perimeter of three objects in the classroom you can measure using an inch ruler. Measure the sides to the nearest whole inch, and then use those measurements to find the perimeter. Record your results in a table.

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

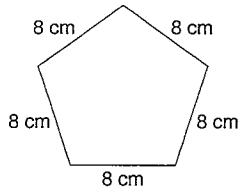


WORK SPACE

INDEPENDENT PRACTICE

Answer the questions.

1. Mario has an eraser shaped like a regular pentagon. What is the perimeter of the eraser?



Ⓐ 32 cm
Ⓑ 40 cm
Ⓒ 48 cm
Ⓓ 64 cm

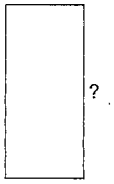
2. A rectangular tabletop has a length of 5 feet and a width of 8 feet. How many feet is the perimeter of the tabletop? Write your answer in the box.

26 ft

3. Select THREE rectangles that have a perimeter of 50 inches.

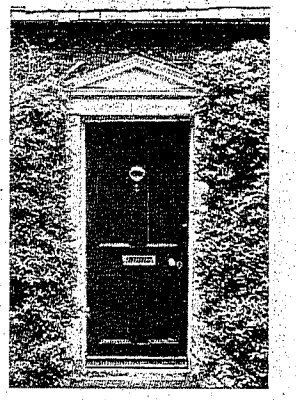
Ⓐ length 5 in., width 10 in.
Ⓑ length 20 in., width 5 in.
Ⓒ length 12 in., width 13 in.
Ⓓ length 30 in., width 20 in.
Ⓔ length 22 in., width 3 in.

4. Michael's front door has a perimeter of 26 feet. The width of the door is 4 feet. What is the length of the door?



Write the missing length in the box.

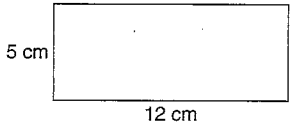
9 ft



HINT, HINT

The perimeter of a shape is the distance around the entire shape.

5. Jamal says that the perimeter of the rectangle is 17 centimeters. What mistake did Jamal make? What is the correct perimeter?



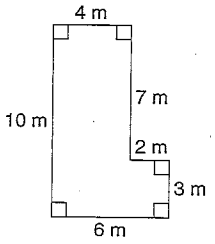
Explain Jamal's mistake and how you found your answer.

Sample answer: Jamal found the sum of the length and the width. He needs to find the sum of all the side lengths. 5 + 12 + 5 + 12 = 34, so the perimeter is 34 cm.

WORK SPACE

6. Eli is mowing the grass in his yard. The shape below shows Eli's yard.

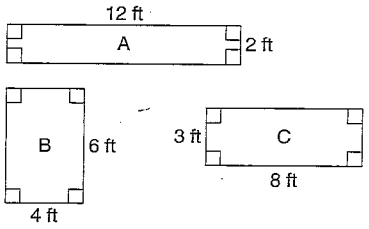
What is the perimeter of Eli's yard?



Ⓐ 18 meters
Ⓑ 28 meters
Ⓒ 32 meters
Ⓓ 60 meters

7. Part A

Derek needs a 24-foot area in his garden to plant herbs. He wants to use the design with the least perimeter. Which design should he choose?



Write the design letter in the box.

B

HINT, HINT

Remember, area is how much space there is inside a shape. Perimeter is the distance around the shape.

Part B

Richard says that a design with a length of 5 feet and a width of 5 feet would be better because it has a smaller perimeter. Is Richard correct?

Explain your thinking.

Sample answer: Richard is not correct. A rectangle with a length of 5 feet and a width of 5 feet would have an area of 25 square feet. The design must have an area of 24 square feet.

TIPS AND TRICKS

For this question, write your answer on the lines provided. For questions like these, be sure to write in complete sentences. After you have written your answer, read it to see if it is clear and makes sense.

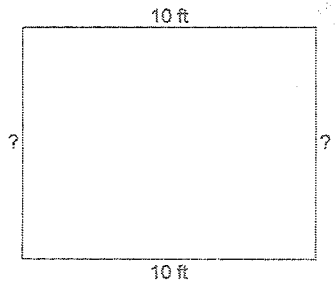
EXIT TICKET

3.MD.8

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

Lucas is helping his dad build a rectangular deck. He is going to put 36 feet of railing around the perimeter of the deck. The deck will be 10 feet long. How wide will the deck be? Draw a picture to help you.

The width of the deck is 8 feet.



2. Name the quadrilateral that matches the description. Remember that a quadrilateral has four sides.
   - Both pairs of opposite sides are parallel.
   - All four sides are the same length.
   - Both pairs of opposite angles are equal. None of the angles are right angles.

Step One Look at the types of quadrilaterals.

It has two pairs of parallel sides, so it is a parallelogram.

Step Two Look at the types of parallelograms.

All four sides are the same length, so it is a rhombus.

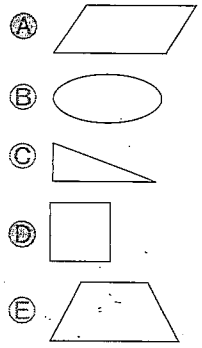
Step Three Look at the types of rhombuses.

None of the angles are right angles, so it is not a square. This quadrilateral is a rhombus.

HINT, HINT

A parallelogram has 2 pairs of equal sides.

3. Select TWO shapes that are parallelograms.



How Am I Doing?

What questions do you have?

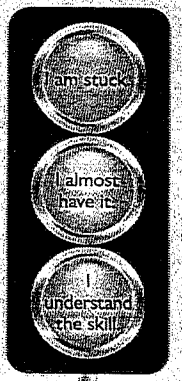
What attributes do you look at to describe and define a polygon?

How could knowing about polygons and their attributes help you in the real-world?

SKETCH IT

Can a quadrilateral have sides that are different lengths and no parallel sides? Explain your answer in the space below and draw a picture to support your answer.

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



INDEPENDENT PRACTICE

Answer the questions.

TIPS AND TRICKS

Look for words that give you information about the question. Then apply that information when you look at the answer choices. For example, if you see the word "triangle," look for a shape with three sides.

WORK SPACE

1. Which of these shapes is NOT a quadrilateral?

   Ⓐ 

   Ⓑ 

   Ⓒ 

   Ⓓ 

2. Which shape is a parallelogram?

   Ⓐ rhombus
   Ⓑ pentagon
   Ⓒ trapezoid
   Ⓓ hexagon

3. Select the statement that is true.

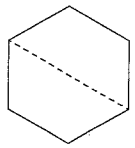
   Ⓐ A polygon cannot be both a square and a rectangle.
   Ⓑ Some trapezoids are parallelograms.
   Ⓒ Some parallelograms are hexagons.
   Ⓓ All parallelograms are quadrilaterals.

WORK SPACE

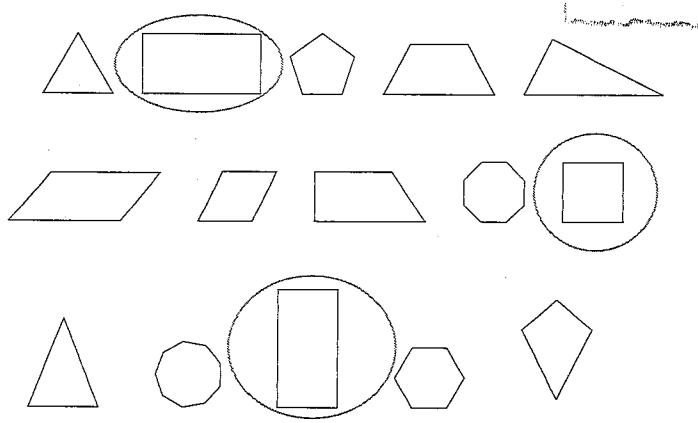
4. Select the statement that is true.

   Ⓐ All trapezoids are parallelograms.
   Ⓑ All rhombuses are squares.
   Ⓒ All quadrilaterals are parallelograms.
   Ⓓ All trapezoids are quadrilaterals.

5. Finish this sentence. Write your answer in the box.
   In the figure shown, the dashed line splits the hexagon into two [trapezoids].

6. Select the THREE shapes that are rectangles.

WORK SPACE

7. Part A

Which name cannot be used to describe the shape below?

Ⓐ quadrilateral

Ⓑ rectangle

Ⓒ trapezoid

Ⓓ square

Part B

Explain your answer to Part A.

Sample answer: The polygon has four sides, so it is a quadrilateral. It has four right angles, so it is a rectangle. The rectangle has four sides that are the same length, so it is a square. It does not have just one pair of parallel sides, so it is not a trapezoid.

8. Part A

Is a regular quadrilateral a rectangle?

◉ Always ○ Sometimes ○ Never

Part B

Explain your answer to Part A.

Sample answer: For a polygon to be regular, all of its sides must be the same length and all of its angles must be equal. A square is the only type of regular quadrilateral. All squares are rectangles, so a regular quadrilateral is a rectangle.

TIPS AND TRICKS

Be sure to read each question carefully. The little words sometimes make a big difference in the meaning of the question.

EXIT TICKET

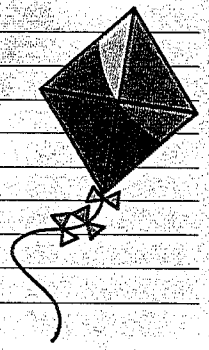
3.G.1

Now that you have mastered recognizing categories of polygons, let's solve the problem in the Real-World Connection.

Will has been asked to design a kite in the shape of a rhombus. What does he need to know about a rhombus to be able to make his design?

Sample answer:

Will needs to know that a rhombus is a quadrilateral, so it has four sides. All the sides of a rhombus are the same length. Also, the opposite angles of a rhombus are equal.



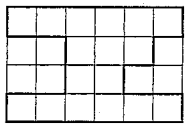
PRACTICE TEST

CHAPTER 5

Answer the questions.

1. What is the area of the shape?

   Write your answer in the box.



1 square ft

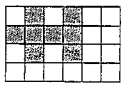
17 square ft

2. Select TWO shaded shapes that have an area of 8 square units.

Ⓐ 

Ⓑ 

Ⓒ 

Ⓓ 

Ⓔ 

3. Select THREE rectangles that have an area of 24 square centimeters.

Ⓐ 2 cm by 10 cm

Ⓑ 4 cm by 5 cm

Ⓒ 6 cm by 4 cm

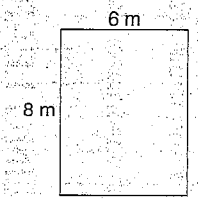
Ⓓ 5 cm by 4 cm

Ⓔ 3 cm by 8 cm

Ⓕ 4 cm by 6 cm

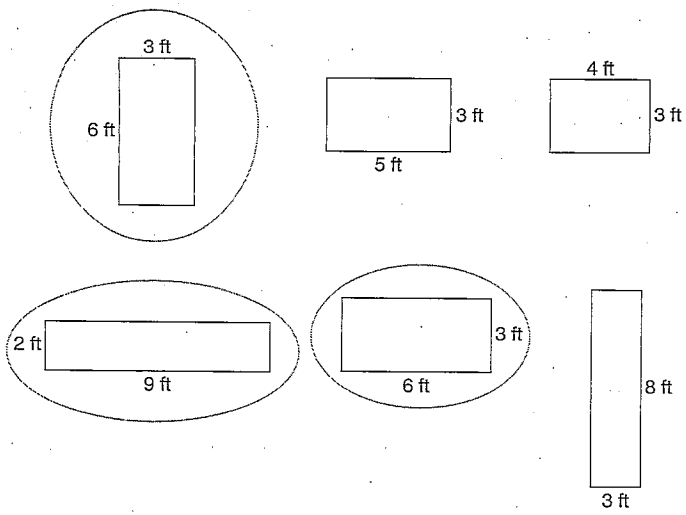
4. What is the area of the figure?

   Write your answer in the box.



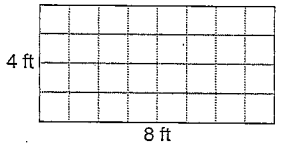
48 square meters

5. Circle THREE rectangles that have an area of 18 square feet.



6. Part A

Corey has a dresser that is 4 feet by 8 feet. Draw lines to show the area of the dresser.

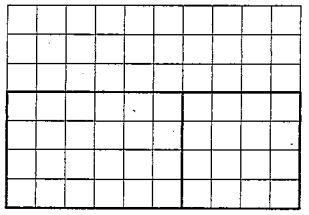


Part B

Explain another way to find the area of the dresser besides drawing lines and counting unit squares.

Sample answer: I could multiply the side lengths of 4 feet by 8 feet to find 32 square feet.

7. Order the steps to find the area of the figure. Write a number from 1–3 next to each step in the table.



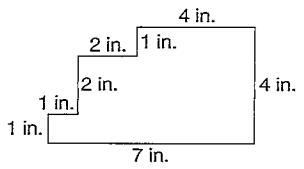
1 square cm

Order	Step
3	24 + 16
1	4 x (6 + 4)
2	(4 x 6) + (4 x 4)

8. What is the area of the figure?

Write your answer in the box.

23 square inches



9. Part A

Is a regular quadrilateral a square?

◉ Always ○ Sometimes ○ Never

Part B

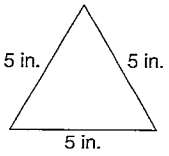
Explain your answer to Part A.

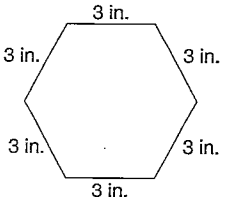
Sample answer: For a polygon to be regular, all of its sides must be the same length and all of its angles must be equal. A square is the only type of regular quadrilateral.

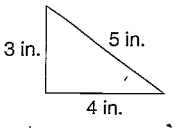
10. A rectangular poster has a perimeter of 18 feet and a width of 8 feet. What is the length of the poster?

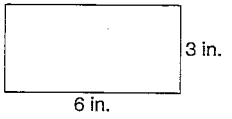
Ⓐ 1 ft
Ⓑ 2 ft
Ⓒ 3 ft
Ⓓ 4 ft

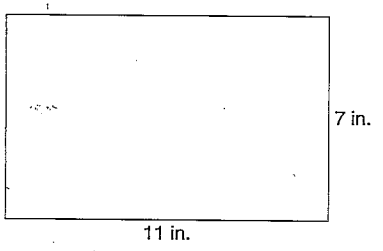
11. Kelli has 18 inches of yarn. She wants to use the yarn to trace all the way around each shape. Which shapes can Kelli trace and have no yarn left over? Select TWO correct answers.

Ⓐ 

Ⓑ 

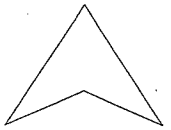
Ⓒ 

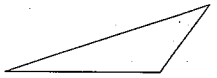
Ⓓ 

Ⓔ 

12. Which of these shapes is NOT a quadrilateral?

Ⓐ 

Ⓑ 

Ⓒ 

Ⓓ 

13. Which statements are true? Select TWO correct answers.

Ⓐ All rhombuses are squares.
Ⓑ All squares are rectangles.
Ⓒ All rhombuses are parallelograms.
Ⓓ All quadrilaterals are parallelograms.
Ⓔ All rectangles are squares.

14. A rectangular tabletop has a length of 6 feet and a width of 10 feet. What is the perimeter of the tabletop?

Ⓐ 10 ft
Ⓑ 16 ft
Ⓒ 32 ft
Ⓓ 60 ft