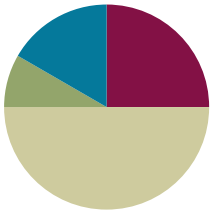
Lesson 19

Objective: Apply the distributive property to decompose units.

Suggested Lesson Structure

Fluency Practice	(15 minutes)
Application Problem	(5 minutes)
Concept Development	(30 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**



Fluency Practice (15 minutes)

- Group Counting **3.OA.1** (3 minutes)
- Commutative Multiplying **3.OA.7** (3 minutes)
- Decompose and Multiply **3.OA.5** (4 minutes)
- Compose and Multiply **3.OA.5** (5 minutes)

Group Counting (3 minutes)

Note: Group counting reviews interpreting multiplication as repeated addition. Counting by threes, fours, fives, and sixes in this activity reviews multiplication with units of 3, 4, and 5 and anticipates multiplication with units of 6 in Module 3.

- Count by fours to 40, whisper and talk forward and backward.
- Count by sixes to 36 forward and backward. Emphasize the 24 to 30 transition.
- Count by threes to 30 forward and backward.
- Count by fives to 50 forward and backward.

Commutative Multiplying (3 minutes)

Note: This activity reviews the commutativity of multiplication, learned in Lessons 7, 8, and 15.

T: (Write 3 x 2 = ___.) Say the multiplication sentence.
S: 3 x 2 = 6.
T: Flip it.
S: 2 x 3 = 6.

Repeat process for 5 x 2, 5 x 3, 3 x 4, 2 x 8, and 3 x 7.

Decompose and Multiply (4 minutes)

Materials: (S) Personal white boards

Note: This activity anticipates multiplication using units of 6, 7, 8, and 9 by decomposing larger facts into smaller known facts. It reviews the distributive property strategy.

T: (Write 7 fours =___.) Write the multiplication sentence.
S: (Write 7 fours = ___.)
T: (Write (5 fours) + (____ fours) = below 7 fours =___.) 7 fours is the same as 5 fours and how many fours?
S: 2 fours.
T: (Write (5 fours) + (2 fours) =. Below it, write 20 + ____ = ____.) Complete the equation.
S: (Write 7 fours = 28. Below it, write (5 fours) + (2 fours) = 28. Below that line, they write 20 + 8 = 28.)

Repeat for possible sequence: 8 x 3, 9 x 2, and 6 x 4. Change missing numbers that students need to fill in.

Compose and Multiply (5 minutes)

Materials: (S) Personal white boards

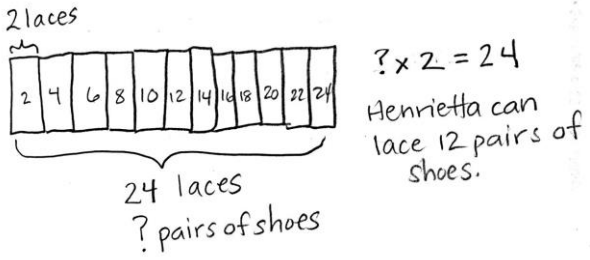
Note: This activity anticipates multiplication using units of 6, 7, 8, and 9 by composing smaller known facts into larger unknown facts. It reviews the distributive property strategy.

T: (Write (5 x 3) + (2 x 3) =___.) Write the number sentence on your personal white boards. Below the number sentence, write an addition sentence.
S: (Write (5 x 3) + (2 x 3) = 21. Below it, write 15 + 6 = 21.)
T: Write (5 x 3) + (2 x 3) as a single multiplication sentence.
S: (Write 7 x 3 = 21 above (5 x 3) + (2 x 3) = 21.)

Repeat for possible sequence: 8 x 2 and 9 x 4.

Application Problem (5 minutes)

Henrietta works in a shoe store. She uses 2 shoelaces to lace each pair of shoes. She has a total of 24 laces. How many pairs of shoes can Henrietta lace?



Note: This problem reviews material from Lesson 18 but intentionally previews 24 ÷ 2, which is used in the first example of the concept development. Students may choose to solve the application problem with division or as an unknown factor multiplication problem. Use these variations in method to spark discussion.

Concept Development (30 minutes)

Materials: (S) Personal white boards

Problem 1: Model *break apart* and *distribute* using an array as a strategy for division.

Draw or project a 12 x 2 array and write 24 ÷ 2 = ____ above it.

T: Let's use the array to help us solve 24 ÷ 2 = ____. There are 24 dots total. (Draw a line after the 10th row.) This shows one way to break apart the array.

T: Write division equations that represent the part of the array above the line and the part of the array below the line.

S: (Write 20 ÷ 2 = 10 and 4 ÷ 2 = 2.)

T: How many twos are above the line?

S: 10 twos.

T: How many twos are below the line?

S: 2 twos.

T: Let's rewrite this as the addition of two quotients. Use my frame.

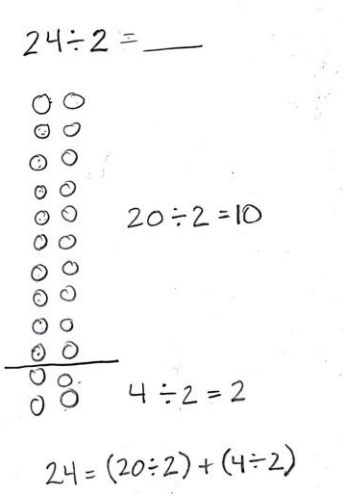
(____ ÷ 2) + (____ ÷ 2) = _____ ÷ 2

_____ + _____ = _____

S: (Line 1: fill in totals, Line 2: 10 + 2 = 12)

T: Explain to your partner the process we used to solve 24 ÷ 2.

S: We added the quotients of 2 smaller facts to find the quotient of a larger one.



Repeat the process with a 13 x 2 array to show 26 ÷ 2. Break into 20 ÷ 2 and 6 ÷ 2.

Problem 2: Break apart and distribute as a strategy for division.

T: (Write 27 ÷ 3 = ____.) What are we focused on when we break apart to divide? Breaking up the number of groups (or rows) like in multiplication or breaking up the total?

S: Breaking up the total.

T: Let's break up 27 into 15 and what __ 15 plus what equals 27?

S: 12.

T: Work with a partner to draw an array that shows 27 ÷ 3, where 3 is the number of columns.

S: (Draw a 9 x 3 array.)

T: Box the part of your array that shows a total of 15.

S: (Box the first 5 rows.)

T: Write a division equation for the boxed portion to the right of the array.

S: (Write 15 ÷ 3 = 5.)

T: Box the part of your array that shows a total of 12.

S: (Box the remaining 4 rows.)

T: Now write a division equation for that part of the array.

S: (Write 12 ÷ 3 = 4.)

T: Tell your partner how you will use the equations to help you solve the original problem,

27 ÷ 3 = __.

S: I'll add the quotients of the 2 smaller facts.

T: (Write the following.) Complete the following sequence to solve 27 ÷ 3 with your partner.

27 ÷ 3 = (15 ÷ 3) + (12 ÷ 3)

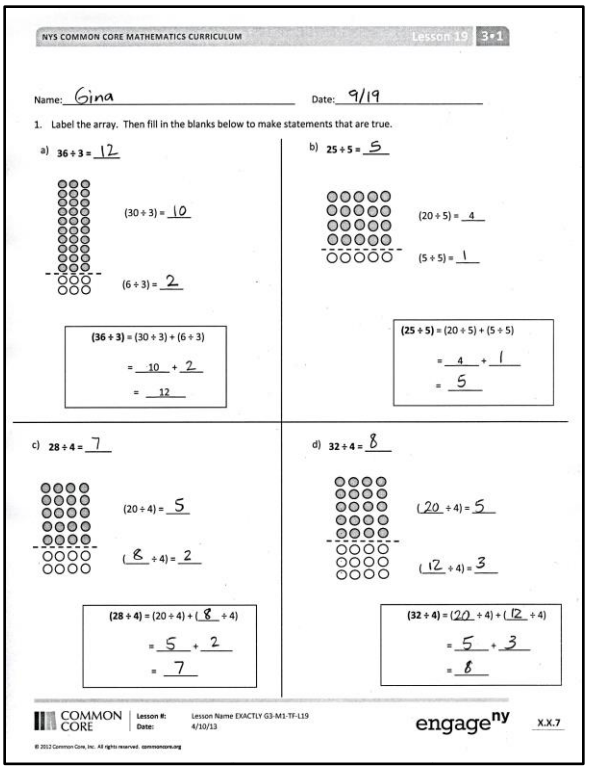
= _____ + _____

= _____

Repeat the process with 33 ÷ 3. Students can break apart 33 by using the number pair 30 and 3.

NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

Add a challenge by asking students to think about other ways of breaking apart 27. A student will most likely choose a quotient that is not divisible by 3. This will lead to a discussion in which you help students realize that with division, the strategy relies on the decomposition being such that the dividends must be divisible by the divisor.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Name: Gina Date: 9/19

1. Label the array. Then fill in the blanks below to make statements that are true.

a) 36 ÷ 3 = 12

(30 ÷ 3) = 10

(6 ÷ 3) = 2

(36 ÷ 3) = (30 ÷ 3) + (6 ÷ 3)
= 10 + 2
= 12

b) 25 ÷ 5 = 5

(20 ÷ 5) = 4

(5 ÷ 5) = 1

(25 ÷ 5) = (20 ÷ 5) + (5 ÷ 5)
= 4 + 1
= 5

c) 28 ÷ 4 = 7

(20 ÷ 4) = 5

(8 ÷ 4) = 2

(28 ÷ 4) = (20 ÷ 4) + (8 ÷ 4)
= 5 + 2
= 7

d) 32 ÷ 4 = 8

(20 ÷ 4) = 5

(12 ÷ 4) = 3

(32 ÷ 4) = (20 ÷ 4) + (12 ÷ 4)
= 5 + 3
= 8

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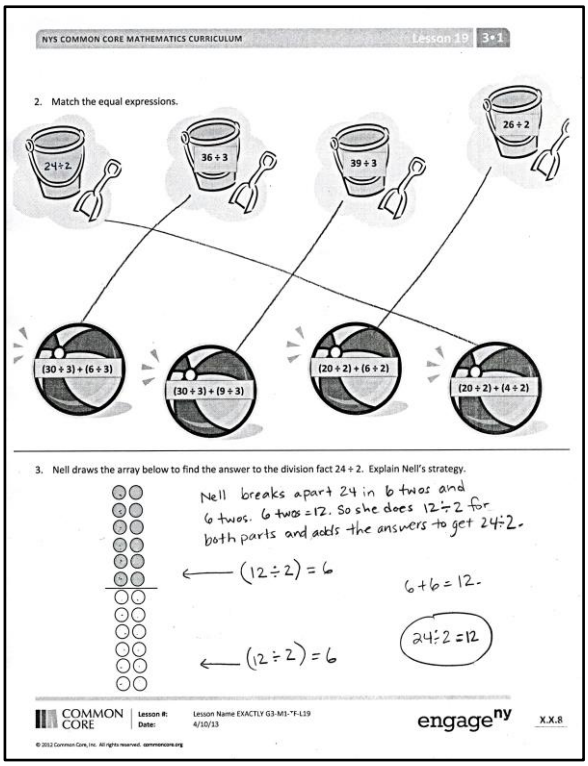
NOTES ON MULTIPLE MEANS OF REPRESENTATION:

If appropriate, encourage the class or individual students to solve 33 ÷ 3 without using an array.

Problem Set (10 minutes)

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

Student Debrief (10 minutes)



Lesson Objective: Apply the distributive property to decompose units.

The Student Debrief is intended to invite reflection and active processing of the total lesson experience. Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set and process the lesson. You may choose to use any combination of the ideas below to lead the discussion.

- Compare Nell's strategy in Problem 3, to the strategy for solving 24 ÷ 2 in the concept development.
- Yesterday we used the break apart and distribute strategy with multiplication. How is the method we learned today similar?
- How is the break apart and distribute strategy different for multiplication and division? (This strategy works for division when the totals used in the decomposition are both divisible by the divisor. For example, decomposing 33 into 25 and 8 is not effective because the divisor is 3.

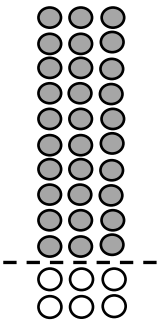
Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students' understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.

Name _____ Date _____

1. Label the array. Then fill in the blanks below to make statements that are true.

a. 36 ÷ 3 = _____



(30 ÷ 3) = _____

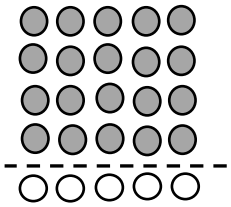
(6 ÷ 3) = _____

(36 ÷ 3) = (30 ÷ 3) + (6 ÷ 3)

= 10 + _____

= 12

b. 25 ÷ 5 = _____



(20 ÷ 5) = 4

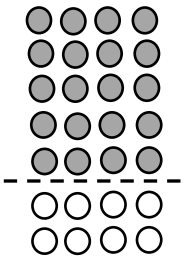
(5 ÷ 5) = _____

(25 ÷ 5) = (20 ÷ 5) + (5 ÷ 5)

= = 4 + _____

= _____

c. 28 ÷ 4 = _____



(20 ÷ 4) = _____

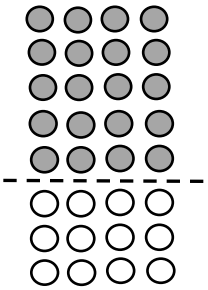
(_____ ÷ 4) = _____

(28 ÷ 4) = (20 ÷ 4) + (_____ ÷ 4)

= _____ + _____

= _____

d. 32 ÷ 4 = _____



(_____ ÷ 4) = _____

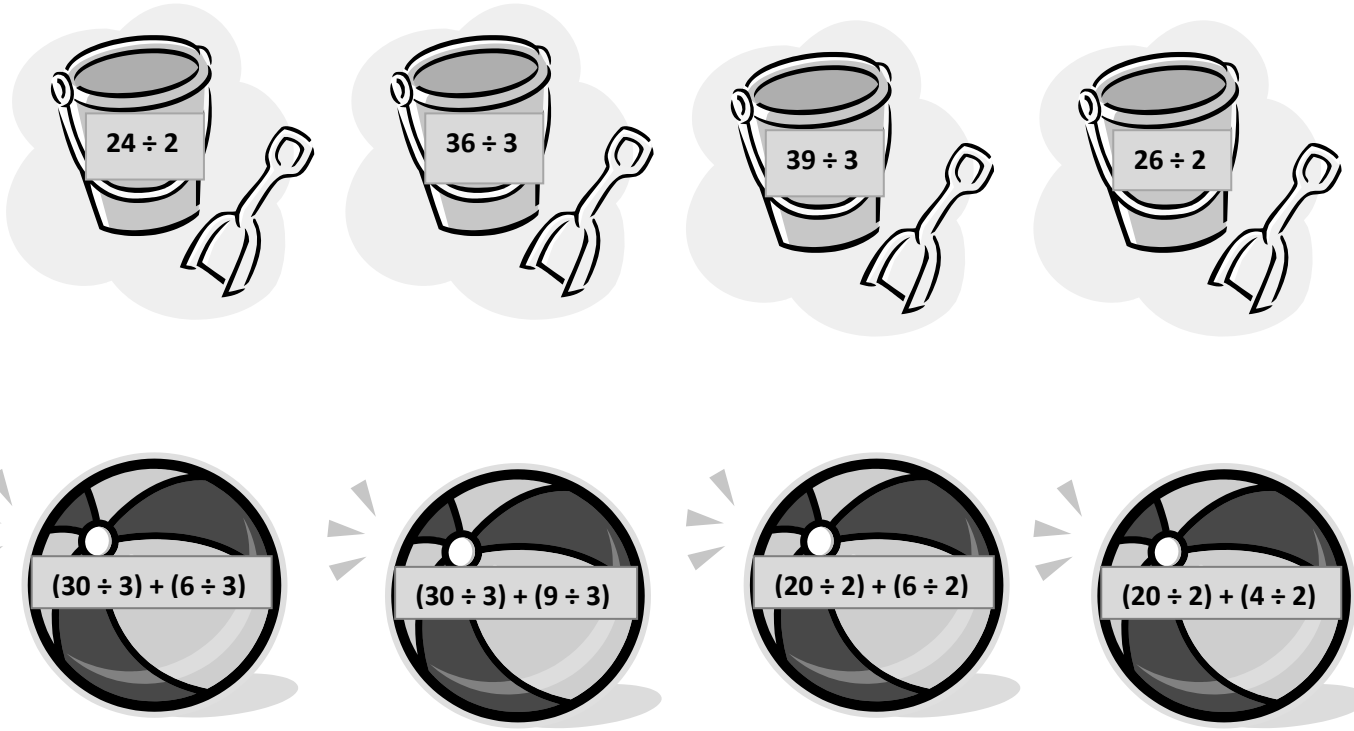
(_____ ÷ 4) = _____

(32 ÷ 4) = (_____ ÷ 4) + (_____ ÷ 4)

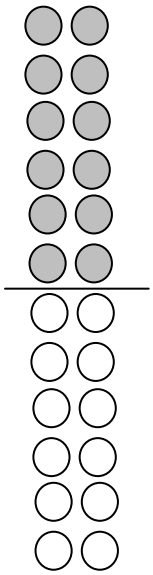
= _____ + _____

= _____

2. Match the equal expressions.

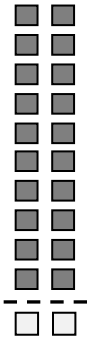


3. Nell draws the array below to find the answer to the division fact 24 ÷ 2. Explain Nell's strategy.



Name _____ Date _____

Complete the equations below to solve 22 ÷ 2 = _____.



(20 ÷ 2) = _____

(_____ ÷ 2) = _____

(22 ÷ 2) = (20 ÷ 2) + (_____ ÷ 2)

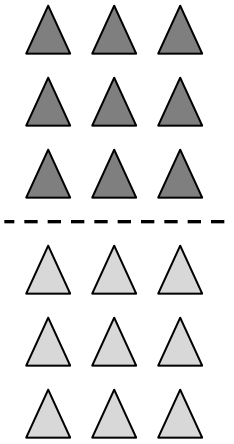
= _____ + _____

= _____

Name _____ Date _____

1. Label the array. Then complete the equations to make statements that are true. .

a. 18 ÷ 3 = _____



(9 ÷ 3) = 3

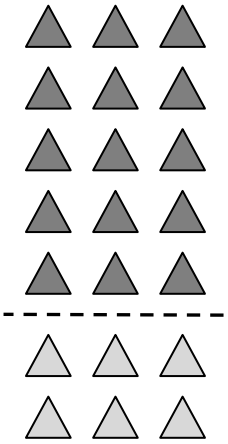
(9 ÷ 3) = _____

(18 ÷ 3) = (9 ÷ 3) + (9 ÷ 3)

= 3 + _____

= 6

b. 21 ÷ 3 = _____



(15 ÷ 3) = 5

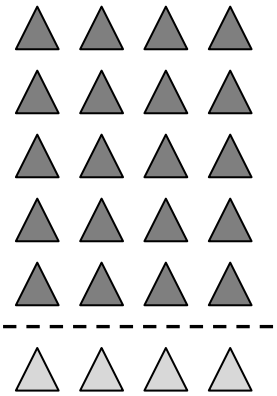
(6 ÷ 3) = _____

(21 ÷ 3) = (15 ÷ 3) + (6 ÷ 3)

= 5 + _____

= _____

c. 24 ÷ 4 = _____



(20 ÷ 4) = _____

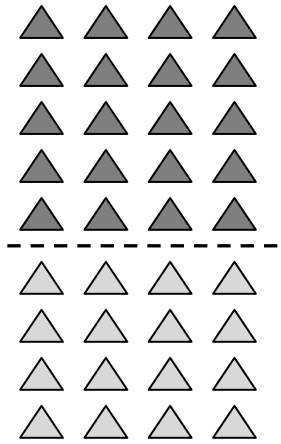
(4 ÷ 4) = _____

(24 ÷ 4) = (20 ÷ 4) + (____ ÷ 4)

= _____ + _____

= _____

d. 36 ÷ 4 = _____



(20 ÷ 4) = _____

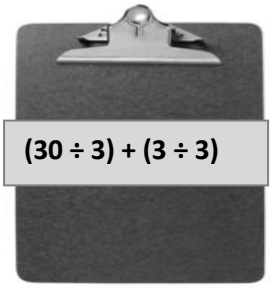
(16 ÷ 4) = _____

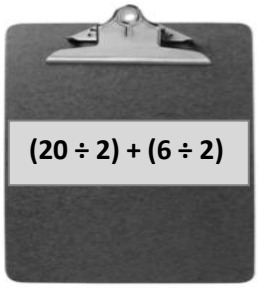
(36 ÷ 4) = (___ ÷ 4) + (___ ÷ 4)

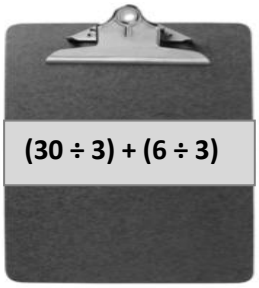
= _____ + _____

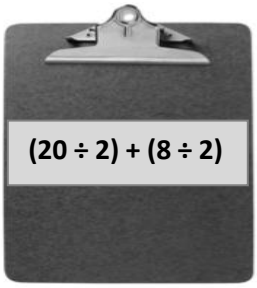
= _____

4. Match equal expressions.









5. Alex draws the array below to find the answer to 35 ÷ 5. Explain Alex's strategy.