

Eureka Math™ Homework Helper

2015–2016

Grade 3 Module 1 *Lessons 1–21*

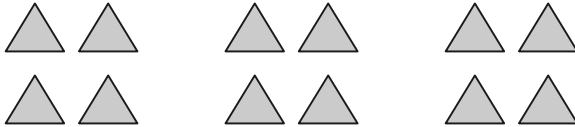
Eureka Math, A Story of Units®

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G3-M1-Lesson 1

1. Solve each number sentence.



I know this picture shows equal groups because each group has the same number of triangles. There are 3 equal groups of 4 triangles.

$$3 \text{ groups of } 4 = 12$$

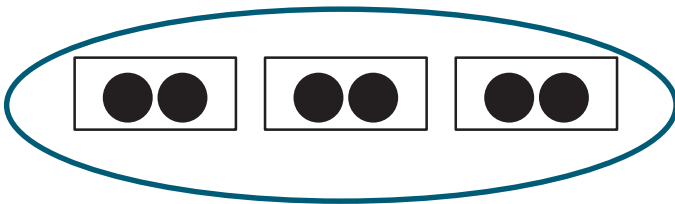
$$3 \text{ fours} = 12$$

$$4 + 4 + 4 = 12$$

$$3 \times 4 = 12$$

I can multiply to find the total number of triangles because multiplication is the same as repeated addition! 3 groups of 4 is the same as 3×4 . There are 12 total triangles, so $3 \times 4 = 12$.

2. Circle the picture that shows 3×2 .



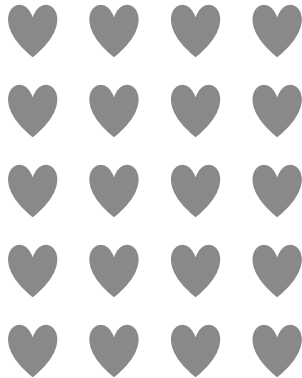
This picture shows 3×2 because it has 3 groups of 2. The groups are equal.



This picture does *not* show 3×2 because the groups are not equal. Two of the groups contain 2 objects, but the other only has 1 object.

G3-M1-Lesson 2

1. Use the array below to answer the questions.



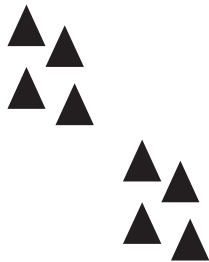
The hearts are arranged in an array, and I know that a row in an array goes straight across. There are 5 rows in this array. Each row has 4 hearts.

- a. What is the number of rows? 5
- b. What is the number of objects in each row? 4
- c. Write a multiplication expression to describe the array. 5×4

I know a multiplication expression is different from an equation because it doesn't have an equal sign.

I can write the expression 5×4 because there are 5 rows with 4 hearts in each row.

2. The triangles below show 2 groups of four.



- a. Redraw the triangles as an array that shows 2 rows of four.



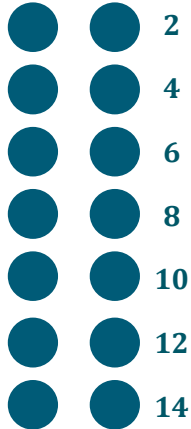
I can redraw the equal groups as an array. I can draw 2 rows with 4 triangles in each row.

I need to make sure to explain how they are the same *and* how they are different!

- b. Compare the groups of triangles to your array. How are they the same? How are they different?

They are the same because they both have the same number of triangles, 8. They are different because the triangles in the array are in rows, but the other triangles are not in rows.

3. Kimberly arranges her 14 markers as an array. Draw an array that Kimberly might make. Then, write a multiplication equation to describe your array.



$$7 \times 2 = 14$$

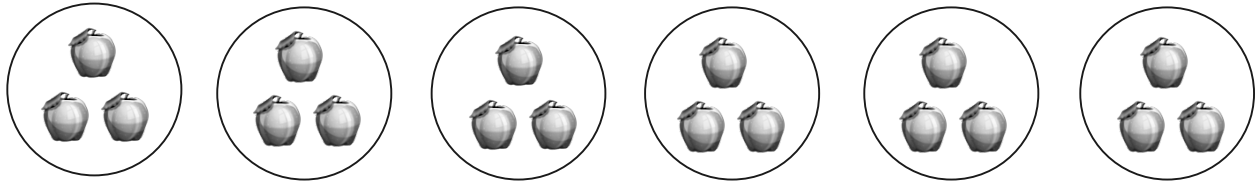
I can write the equation by writing the number of rows (groups), 7, times the number in each group, 2. The product (total) is 14.

This problem doesn't tell me the number of rows or the number of objects in each row. I need to use the total, 14, to make an array. Since 14 is an even number, I am going to make rows of 2. I can skip count by 2 and stop when I get to 14.

I think there are other arrays that would work for a total of 14. I can't wait to see what my friends came up with!

G3-M1-Lesson 3

1. There are 3 apples in each basket. How many apples are there in 6 baskets?



- a. Number of groups: 6 Size of each group: 3
- b. $6 \times \underline{3} = \underline{18}$
- c. There are 18 apples altogether.

Each circle represents 1 basket of apples. There are 6 circles with 3 apples in each circle. The number of groups is 6, and the size of each group is 3. There are 18 apples altogether. I can show this with the equation $6 \times 3 = 18$.

2. There are 3 bananas in each row. How many bananas are there in 4 rows?

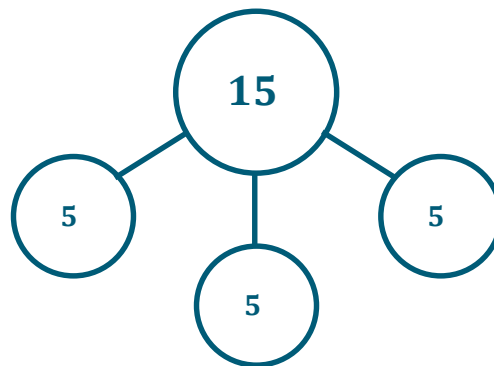
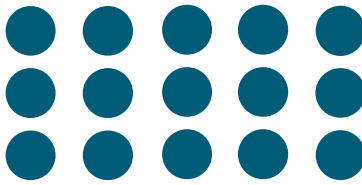


- a. Number of rows: 4 Size of each row: 3
- b. 4 \times 3 = 12
- c. There are 12 bananas altogether.

I can show this with the equation $4 \times 3 = 12$. The 4 in the equation is the number of rows, and 3 is the size of each row.

The factors tell me the number of groups and the size of each group. I can draw an array with 3 rows and 5 in each row.

3. Draw an array using factors 3 and 5. Then, show a number bond where each part represents the amount in one row.

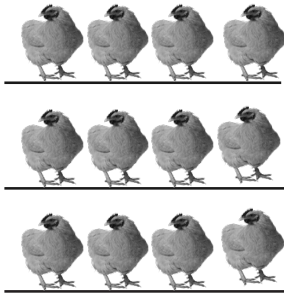


My array shows 3 rows of 5. I could have used the same factors, 3 and 5, to draw an array with 5 rows of 3. Then my number bond would have 5 parts, and each part would have a value of 3.

A number bond shows a part-whole relationship. I can draw a number bond with a total of 15 because there are 15 dots in my array. I can draw 3 parts for my number bond because there are 3 rows in my array. I can label each part in my number bond as 5 because the size of each row is 5.

G3-M1-Lesson 4

1. Fill in the blanks.



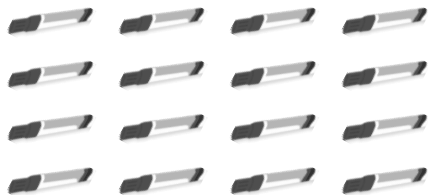
The chickens are arranged in an array. I know there are 12 chickens divided equally into 3 groups since each row represents 1 equal group. Each group (row) has 4 chickens. So, the answer in my division sentence, 4, represents the size of the group.

12 chickens are divided into 3 equal groups.

There are 4 chickens in each group.

$$12 \div 3 = \underline{4}$$

2. Grace has 16 markers. The picture shows how she placed them on her table. Write a division sentence to represent how she equally grouped her markers.



There are 4 markers in each row.

$$\underline{16} \div \underline{4} = \underline{4}$$

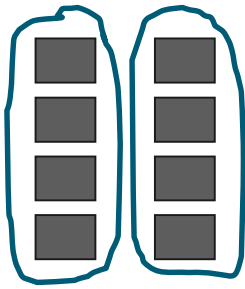
I can write the total number of markers Grace has, 16, since a division equation begins with the total.

The 4 represents the number of equal groups. I know there are 4 equal groups because the array shows 4 rows of markers.

This 4 represents the size of the group. I know this because the array shows 4 markers in each row.

G3-M1-Lesson 5

1. Group the squares to show $8 \div 4 = \underline{\quad}$ where the unknown represents the number of groups.

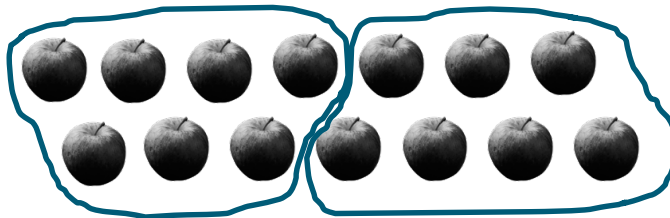


I can circle groups of 4 squares each. Then I can see that there are 2 equal groups.

How many groups are there? 2

$$8 \div 4 = \underline{2}$$

2. Nathan has 14 apples. He puts 7 apples in each basket. Circle the apples to find the number of baskets Nathan fills.



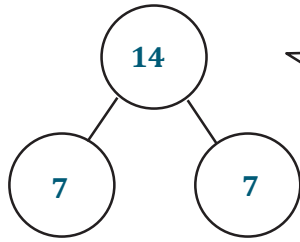
I can circle groups of 7 apples to find the total number of baskets Nathan fills, 2 baskets.

- a. Write a division sentence where the answer represents the number of baskets that Nathan fills.

$$\underline{14} \div \underline{7} = \underline{2}$$

I can write a division sentence beginning with the total number of apples, 14, divided by the number of apples in each basket, 7, to find the number of Nathan's baskets, 2. I can check my answer by comparing it to the circled picture above.

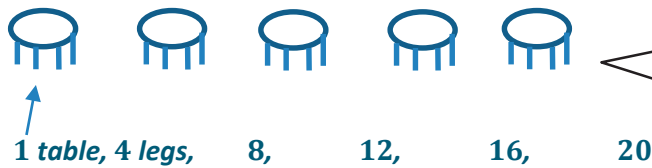
b. Draw a number bond to represent the problem.



I know that a number bond shows a part-whole relationship. I can label 14 as my whole to represent the total number of Nathan's apples. Then I can draw 2 parts to show the number of baskets Nathan fills and label 7 in each part to show the number of apples in each basket.

3. Lily draws tables. She draws 4 legs on each table for a total of 20 legs.

a. Use a count-by to find the number of tables Lily draws. Make a drawing to match your counting.



I can draw models to represent each of Lily's tables. As I draw each table, I can count by four until I reach 20. Then, I can count to find the number of tables Lily draws, 5 tables.

b. Write a division sentence to represent the problem.

$$\underline{20} \div \underline{4} = \underline{5} \quad \text{Lily draws 5 tables.}$$

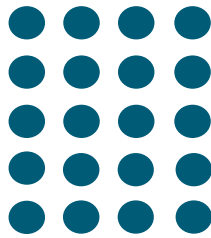
I can write a division sentence beginning with the total number of legs, 20, divided by the number of legs on each table, 4, to find the number of tables Lily draws, 5. I can check my answer by comparing it to my picture and count-by in part (a).

G3-M1-Lesson 6

1. Sharon washes 20 bowls. She then dries and stacks the bowls equally into 5 piles. How many bowls are in each pile?

$$20 \div 5 = \underline{4}$$

$$5 \times \underline{4} = 20$$



I can draw an array with 5 rows to represent Sharon's piles of bowls. I can keep drawing columns of 5 dots until I have a total of 20 dots. The number in each row shows how many bowls are in each pile.

What is the meaning of the unknown factor and quotient? *It represents the size of the group.*

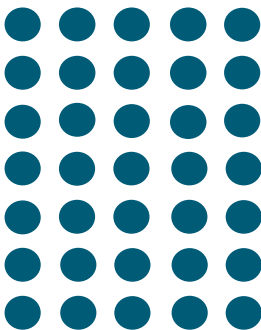
I know that the quotient is the answer you get when you divide one number by another number.

I can see from my array that both the unknown factor and quotient represent the size of the group.

2. John solves the equation $\underline{\quad} \times 5 = 35$ by writing and solving $35 \div 5 = \underline{\quad}$. Explain why John's method works.

John's method works because in both problems there are 7 groups of 5 and a total of 35. The quotient in a division equation is like finding the unknown factor in a multiplication equation.

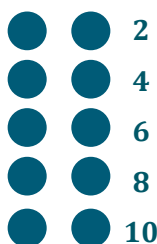
The blanks in John's two equations represent the number of groups. Draw an array to represent the equations.



The answer to both of John's equations is 7. I know 7 represents the number of groups, so I can draw 7 rows in my array. Then I can draw 5 dots in each row to show the size of the group for a total of 35 dots in my array.

G3-M1-Lesson 7

1. Draw an array that shows 5 rows of 2.



I can draw an array that has 5 rows with 2 dots in each row.

Write a multiplication sentence where the first factor represents the number of rows.

$$\underline{5} \times \underline{2} = \underline{10}$$

I can write a multiplication sentence with 5 as the first factor because 5 is the number of rows. The second factor is 2 because there are 2 dots in each row. I can skip-count by 2 to find the product, 10.

2. Draw an array that shows 2 rows of 5.



I can draw an array that has 2 rows with 5 dots in each row.

Write a multiplication sentence where the first factor represents the number of rows.

$$\underline{2} \times \underline{5} = \underline{10}$$

I can write a multiplication sentence with 2 as the first factor because 2 is the number of rows. The second factor is 5 because there are 5 dots in each row. I can skip-count by 5 to find the product, 10.

3. Why are the factors in your multiplication sentences in a different order?

The factors are in a different order because they mean different things. Problem 1 is 5 rows of 2, and Problem 2 is 2 rows of 5. In Problem 1, the 5 represents the number of rows. In Problem 2, the 5 represents the number of dots in each row.

The arrays show the commutative property. The order of the factors changed because the factors mean different things for each array. The product stayed the same for each array.

4. Write a multiplication sentence to match the number of groups. Skip-count to find the totals.

a. 7 twos: $7 \times 2 = 14$

b. 2 sevens: $2 \times 7 = 14$

I see a pattern! 7 twos is equal to 2 sevens. It's the commutative property! The factors switched places and mean different things, but the product didn't change.

7 twos is unit form. It means that there are 7 groups of 2. I can represent that with the multiplication equation $7 \times 2 = 14$. 2 sevens means 2 groups of 7, which I can represent with the multiplication equation $2 \times 7 = 14$.

5. Find the unknown factor to make each equation true.

$$2 \times 8 = 8 \times \underline{2}$$

$$\underline{4} \times 2 = 2 \times 4$$

I can use the commutative property to help me. I know that $2 \times 8 = 16$ and $8 \times 2 = 16$, so I can write 2 in the first blank. To solve the second problem, I know that $4 \times 2 = 8$ and $2 \times 4 = 8$. I can write 4 in the blank.

To make true equations, I need to make sure what's on the left of the equal sign is the same as (or equal to) what's on the right of the equal sign.

G3-M1-Lesson 8

1. Find the unknowns that make the equations true. Then, draw a line to match related facts.

a. $3 + 3 + 3 + 3 = \underline{12}$

d. $3 \times 6 = \underline{18}$

b. $3 \times 7 = \underline{21}$

e. $\underline{12} = 4 \times 3$

c. 5 threes + 1 three = 6 threes

f. $21 = 7 \times \underline{3}$

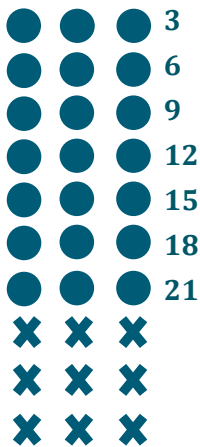
5 threes + 1 three = 6 threes. 6 threes is the same as 6 groups of 3 or 6×3 , which equals 18. I can use the commutative property to match this equation with $3 \times 6 = 18$.

I can use the commutative property to match $3 \times 7 = 21$ and $21 = 7 \times 3$.

$3 + 3 + 3 + 3$ is the same as 4 threes or 4×3 , which equals 12. These equations are related because they both show that 4 groups of 3 equal 12.

2. Fred puts 3 stickers on each page of his sticker album. He puts stickers on 7 pages.

a. Use circles to draw an array that represents the total number of stickers in Fred's sticker album.



I can draw an array with 7 rows to represent the 7 pages of the sticker album. I can draw 3 circles in each row to represent the 3 stickers that Fred puts on each page.

I can draw 3 more rows of 3 to represent the 3 pages and 3 stickers on each page that Fred adds to his sticker album in part (c).

- b. Use your array to write and solve a multiplication sentence to find Fred's total number of stickers.

$$7 \times 3 = 21$$

Fred puts 21 stickers in his sticker album.

I can write the multiplication equation $7 \times 3 = 21$ to find the total because there are 7 rows in my array with 3 circles in each row. I can use my array to skip-count to find the total, 21.

- c. Fred adds 3 more pages to his sticker album. He puts 3 stickers on each new page. Draw x's to show the new stickers on the array in part (a).

- d. Write and solve a multiplication sentence to find the new total number of stickers in Fred's sticker album.

$$24, 27, 30$$

$$10 \times 3 = 30$$

Fred has a total of 30 stickers in his sticker album.

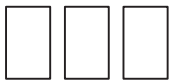
I can continue to skip-count by three from 21 to find the total, 30. I can write the multiplication equation $10 \times 3 = 30$ to find the total because there are 10 rows in my array with 3 in each row. The number of rows changed, but the size of each row stayed the same.

G3-M1-Lesson 9

1. Matt organizes his baseball cards into 3 rows of three. Jenna adds 2 more rows of 3 baseball cards. Complete the equations to describe the total number of baseball cards in the array.



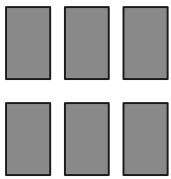
a. $(3 + 3 + 3) + (3 + 3) = \underline{15}$



b. 3 threes + 2 threes = 5 threes



c. 5 $\times 3 = \underline{15}$

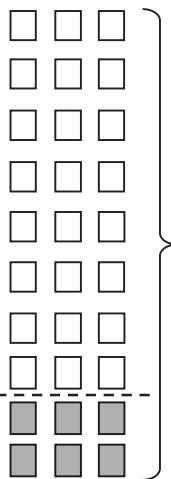


The multiplication equation for this array is $5 \times 3 = 15$ because there are 5 threes or 5 rows of 3, which is a total of 15 baseball cards.

The total for Matt's baseball cards (the unshaded rectangles) can be represented by $3 + 3 + 3$ because there are 3 rows of 3 baseball cards. The total for Jenna's baseball cards (the shaded rectangles) can be represented by $3 + 3$ because there are 2 rows of 3 baseball cards. This can be represented in unit form with 3 threes + 2 threes, which equals 5 threes.

2. $8 \times 3 = \underline{24}$

I can find the product of 8×3 using the array and the equations below. This problem is different than the problem above because now I am finding two products and subtracting instead of adding.



$10 \times 3 = \underline{30}$

The multiplication equation for the whole array is $10 \times 3 = 30$. The multiplication equation for the shaded part is $2 \times 3 = 6$.

$2 \times 3 = \underline{6}$

$$30 - \underline{6} = 24$$

$$\underline{8} \times 3 = 24$$

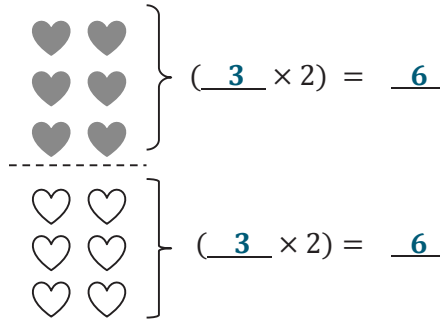
To solve 8×3 , I can think of 10×3 because that's an easier fact. I can subtract the product of 2×3 from the product of 10×3 . $30 - 6 = 24$, so $8 \times 3 = 24$.

G3-M1-Lesson 10

1. Use the array to help you fill in the blanks.

$$6 \times 2 = \underline{12}$$

The dotted line in the array shows how I can break apart 6×2 into two smaller facts. Then I can add the products of the smaller facts to find the product of 6×2 .



I know the first factor in each equation is 3 because there are 3 rows in each of the smaller arrays. The product for each array is 6.

$$(3 \times 2) + (3 \times 2) = \underline{6} + \underline{6}$$

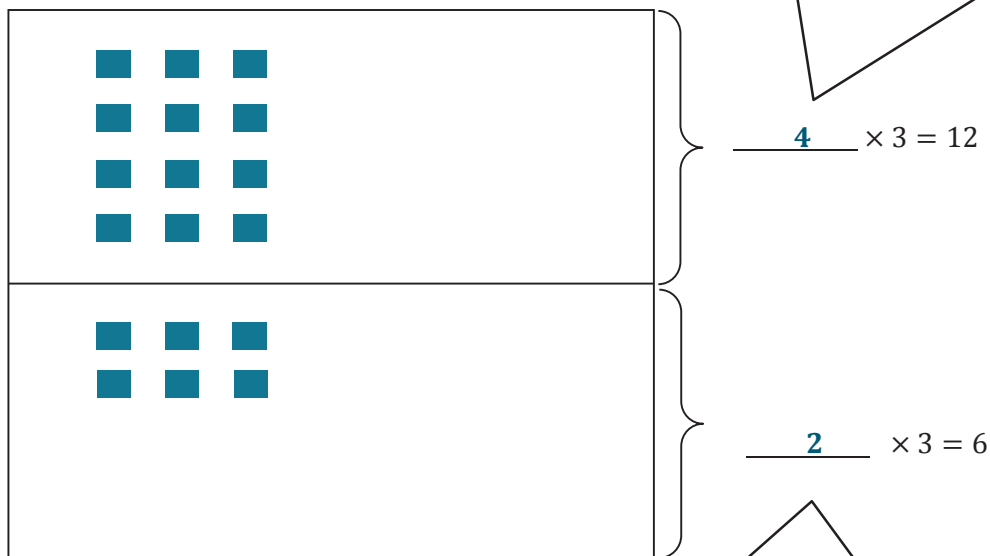
$$\underline{6} \times 2 = \underline{12}$$

The expressions in the parentheses represent the smaller arrays. I can add the products of these expressions to find the total number of hearts in the array. The products of the smaller expressions are both 6. $6 + 6 = 12$, so $6 \times 2 = 12$.

Hey, look! It's a doubles fact! $6 + 6 = 12$. I know my doubles facts, so this is easy to solve!

2. Lilly puts stickers on a piece of paper. She puts 3 stickers in each row.
- a. Fill in the equations to the right. Use them to draw arrays that show the stickers on the top and bottom parts of Lilly's paper.

I know there are 3 stickers in each row, and this equation also tells me that there are 12 stickers in all on the top of the paper. I can skip-count by 3 to figure out how many rows of stickers there. 3, 6, 9, 12. I skip-counted 4 threes, so there are 4 rows of 3 stickers. Now I can draw an array with 4 rows of 3.

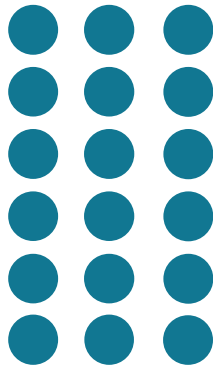


I see 6 rows of 3 altogether. I can use the products of these two smaller arrays to solve 6×3 .

I can use the same strategy to find the number of rows in this equation. I skip-counted 2 threes, so there are 2 rows of 3 stickers. Now I can draw an array with 2 rows of 3.

G3-M1-Lesson 11

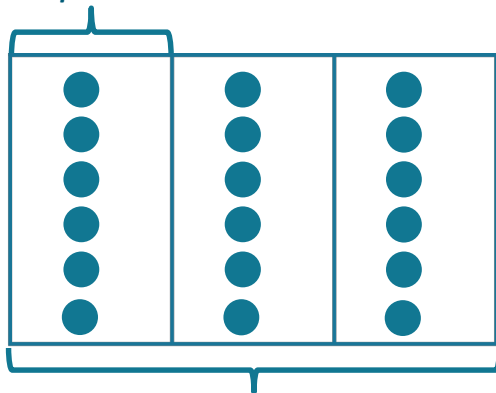
1. Mr. Russell organizes 18 clipboards equally into 3 boxes. How many clipboards are in each box? Model the problem with both an array and a labeled tape diagram. Show each column as the number of clipboards in each box.



I can draw an array with 3 columns because each column represents 1 box of clipboards. I can draw rows of 3 dots until I have a total of 18 dots. I can count how many dots are in each column to solve the problem.

I know the total number of clipboards is 18, and there are 3 boxes of clipboards. I need to figure out how many clipboards are in each box. I can think of this as division, $18 \div 3 = \underline{\quad}$, or as multiplication, $3 \times \underline{\quad} = 18$.

? clipboards



18 clipboards

I can draw 3 units in my tape diagram to represent the 3 boxes of clipboards. I can label the whole tape diagram with "18 clipboards". I can label one unit in the tape diagram with "? clipboards" because that's what I am solving for. I can draw 1 dot in each unit until I have a total of 18 dots.

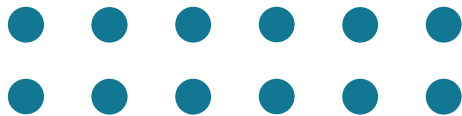
There are 6 clipboards in each box.

Look, my array and tape diagram both show units of 6. The columns in my array each have 6 dots, and the units in my tape diagram each have a value of 6.

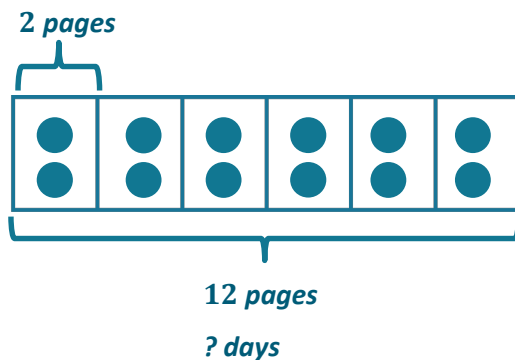
I know the answer is 6 because my array has 6 dots in each column. My tape diagram also shows the answer because there are 6 dots in each unit.

2. Caden reads 2 pages in his book each day. How many days will it take him to read a total of 12 pages?

This problem is different than the other problem because the known information is the total and the size of each group. I need to figure out how many groups there are.



I can draw an array where each column represents the number of pages Caden reads each day. I can keep drawing columns of 2 until I have a total of 12.



I can use my array to help me draw a tape diagram. I can draw 6 units of 2 in my tape diagram because my array shows 6 columns of 2.

$$12 \div 2 = 6$$

I know the answer is 6 because my array shows 6 columns of 2, and my tape diagram shows 6 units of 2.

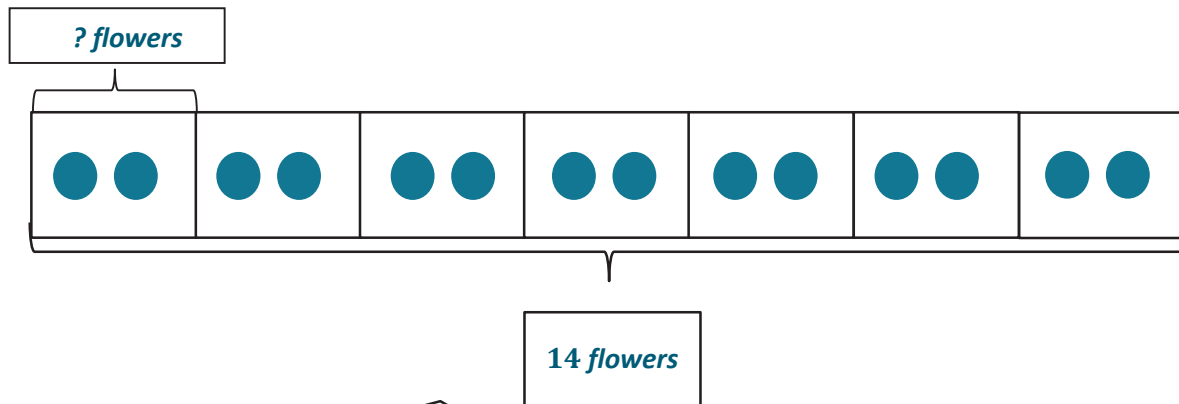
It will take Caden 6 days to read a total of 12 pages.

I can write a statement to answer the question.

G3-M1-Lesson 12

1. Mrs. Harris divides 14 flowers equally into 7 groups for students to study. Draw flowers to find the number in each group. Label known and unknown information on the tape diagram to help you solve.

I know the total number of flowers and the number of groups. I need to solve for the number of flowers in each group.



I can label the value of the tape diagram as “14 flowers”. The number of units in the tape diagram, 7, represents the number of groups. I can label the unknown, which is the value of each unit, as “? flowers”. I can draw 1 flower in each unit until I have a total of 14 flowers. I can draw dots instead of flowers to be more efficient!

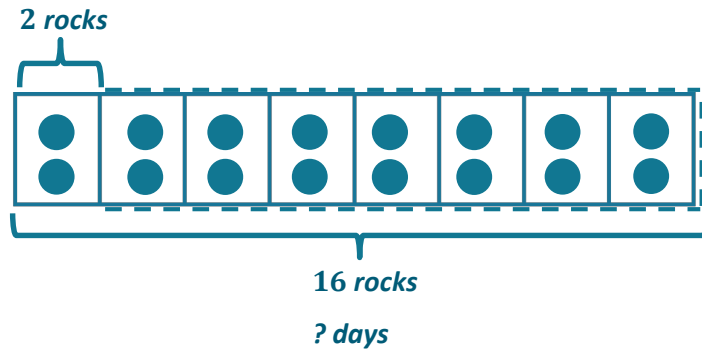
I can use my tape diagram to solve the problem by counting the number of dots in each unit.

$$7 \times \underline{2} = 14$$

$$14 \div 7 = \underline{2}$$

There are 2 flowers in each group.

2. Lauren finds 2 rocks each day for her rock collection. How many days will it take Lauren to find 16 rocks for her rock collection?



I know the total is 16 rocks. I know Lauren finds 2 rocks each day, which is the size of each group. I need to figure out how many days it will take her to collect 16 rocks. The unknown is the number of groups.

I can draw a tape diagram to solve this problem. I can draw a unit of 2 to represent the 2 rocks that Lauren collects each day. I can draw a dotted line to estimate the total days. I can draw units of 2 until I have a total of 16 rocks. I can count the number of units to find the answer.

$$16 \div 2 = 8$$

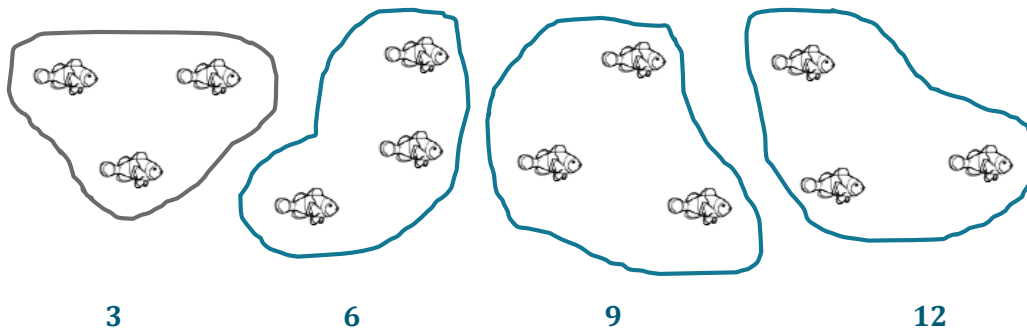
I know the answer is 8 because my tape diagram shows 8 units of 2.

It will take Lauren 8 days to find 16 rocks.

I can write a statement to answer the question.

G3-M1-Lesson 13

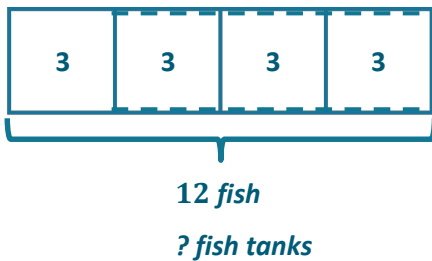
1. Mr. Stroup's pet fish are shown below. He keeps 3 fish in each tank.
- a. Circle to show how many fish tanks he has. Then, skip-count to find the total number of fish.



I can circle groups of 3 fish and skip-count by 3 to find the total number of fish. I can count the number of groups to figure out how many fish tanks Mr. Stroup has.

Mr. Stroup has a total of 12 fish in 4 tanks.

- b. Draw and label a tape diagram to represent the problem.



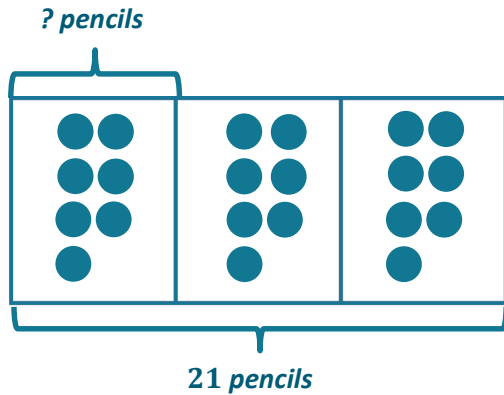
I can use the picture in part (a) to help me draw a tape diagram. Each fish tank has 3 fish, so I can label each unit with the number 3. I can draw a dotted line to estimate the total fish tanks. I can label the total as 12 fish. Then I can draw units of 3 until I have a total of 12 fish.

The picture and the tape diagram both show that there are 4 fish tanks. The picture shows 4 equal groups of 3, and the tape diagram shows 4 units of 3.

$$\underline{12} \div 3 = \underline{4}$$

Mr. Stroup has 4 fish tanks.

2. A teacher has 21 pencils. They are divided equally among 3 students. How many pencils does each student get?



I can draw a tape diagram to solve this problem. I can draw 3 units to represent the 3 students. I can label the total number of pencils as 21 pencils. I need to figure out how many pencils each student gets.

I know that I can divide 21 by 3 to solve. I don't know $21 \div 3$, so I can draw one dot in each unit until I have a total of 21 dots. I can count the number of dots in one unit to find the quotient.

$$21 \div 3 = 7$$

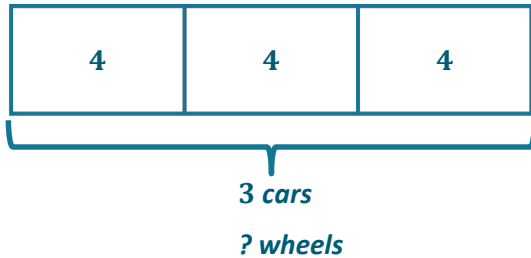
I know the answer is 7 because my tape diagram shows 3 units of 7.

Each student will get 7 pencils.

I can write a statement to answer the question.

G3-M1-Lesson 14

1. Mrs. Smith replaces 4 wheels on 3 cars. How many wheels does she replace? Draw and label a tape diagram to solve.



I can draw a tape diagram with 3 units to represent the 3 cars. Each car has 4 wheels, so I can label each unit with the number 4. I need to find the total number of wheels.

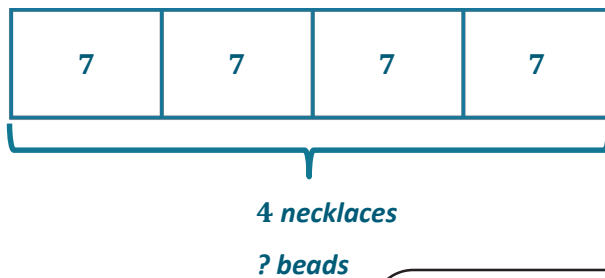
4, 8, 12

$$3 \times 4 = 12$$

I can skip-count by fours or multiply 3×4 to find how many wheels Mrs. Smith replaces.

Mrs. Smith replaces 12 wheels.

2. Thomas makes 4 necklaces. Each necklace has 7 beads. Draw and label a tape diagram to show the total number of beads Thomas uses.



I can draw a tape diagram with 4 units to represent the 4 necklaces. I can label each unit in the tape diagram to show that every necklace has 7 beads. I need to find the total number of beads.

7, 14, 21, 28

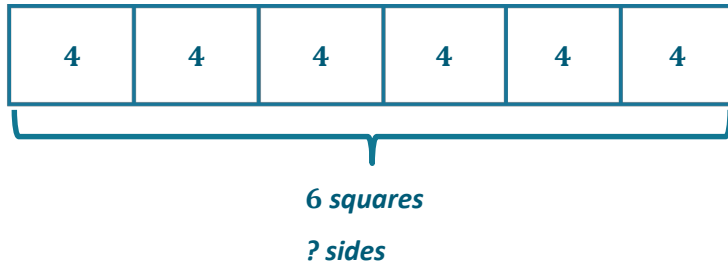
4, 8, 12, 16, 20, 24, 28

$$4 \times 7 = 28$$

I can skip-count 4 sevens, but sevens are still tricky for me. I can skip-count 7 fours instead! I can also multiply 4×7 to find how many beads Thomas uses.

Thomas uses 28 beads.

3. Find the total number of sides on 6 squares.



I can draw a tape diagram with 6 units to represent the 6 squares. All squares have 4 sides, so I can label each unit with the number 4. I need to find the total number of sides.

4, 8, 12, 16, 20, 24

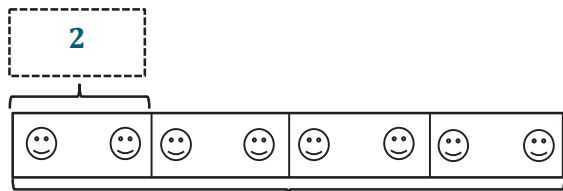
$$6 \times 4 = 24$$

There are 24 sides on 6 squares.

I can skip-count 6 fours or multiply 6×4 to find the total number of sides on 6 squares.

G3-M1-Lesson 15

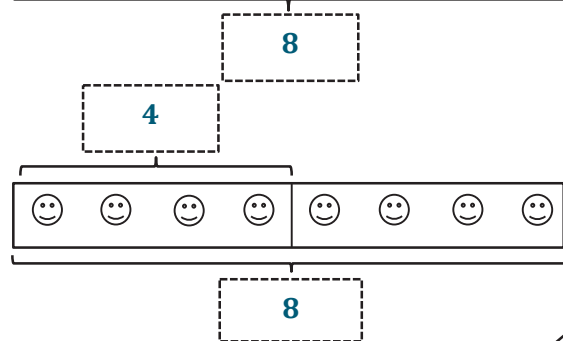
1. Label the tape diagrams, and complete the equations. Then, draw an array to represent the problems.



$4 \times 2 = \underline{8}$



The tape diagram shows 4 units of 2. I can draw an array with 4 rows of 2.



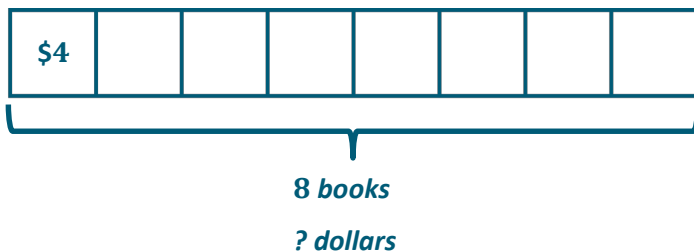
$2 \times 4 = \underline{8}$



The tape diagram shows 2 units of 4. I can draw an array with 2 rows of 4.

One tape diagram shows 2 units of 4, and the other shows 4 units of 2. The pictures look different, but they both show a total of 8.

2. 8 books cost \$4 each. Draw and label a tape diagram to show the total cost of the books.



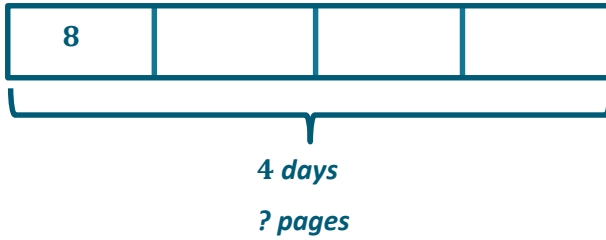
I can draw a tape diagram with 8 units to represent the 8 books. Each book costs \$4, so each unit represents 4. I need to find the total cost.

$8 \times 4 = 32$

The books cost 32 dollars.

8 fours or 8×4 is equal to 32.

3. Liana reads 8 pages from her book each day. How many pages does Liana read in 4 days?



I can draw a tape diagram with 4 units to represent the 4 days. Liana reads 8 pages each day, so each unit represents 8. I need to find the total number of pages.

$$4 \times 8 = 32$$

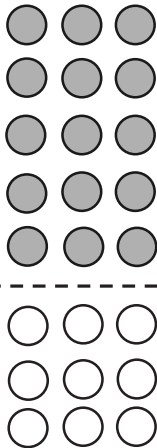
Liana reads 32 pages.

I just solved 8×4 , and I know that $8 \times 4 = 4 \times 8$. If 8 fours is equal to 32, then 4 eights is also equal to 32.

G3-M1-Lesson 16

1. Label the array. Then, fill in the blanks below to make true number sentences.

$$8 \times 3 = \underline{24}$$



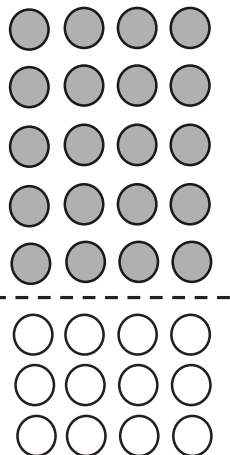
$$(5 \times 3) = \underline{15}$$

$$(3 \times 3) = \underline{9}$$

I know that I can break apart 8 threes into 5 threes and 3 threes. I can add the products for 5×3 and 3×3 to find the product for 8×3 .

$$\begin{aligned} 8 \times 3 &= (5 \times 3) + (3 \times 3) \\ &= \underline{15} + \underline{9} \\ &= \underline{24} \end{aligned}$$

2. The array below shows one strategy for solving 8×4 . Explain the strategy using your own words.



$$(5 \times 4) = \underline{20}$$

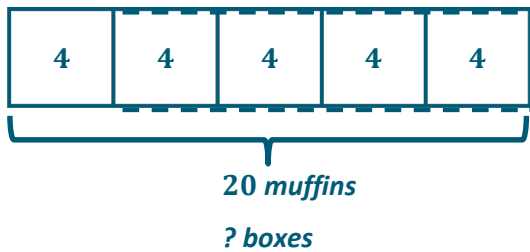
$$(3 \times 4) = \underline{12}$$

8×4 is a tricky fact for me to solve, but 5×4 and 3×4 are both pretty easy facts. I can use them to help me!

I split apart the 8 rows of 4 into 5 rows of 4 and 3 rows of 4. I split the array there because my fives facts and my threes facts are easier than my eights facts. I know that $5 \times 4 = 20$ and $3 \times 4 = 12$. I can add those products to find that $8 \times 4 = 32$.

G3-M1-Lesson 17

1. The baker packs 20 muffins into boxes of 4. Draw and label a tape diagram to find the number of boxes she packs.

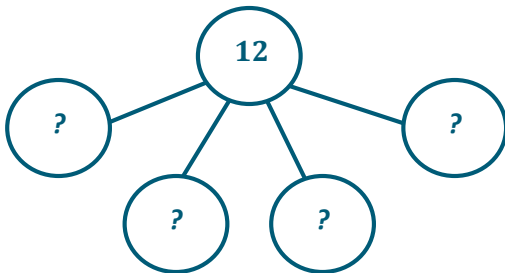


$$20 \div 4 = \underline{5}$$

The baker packs 5 boxes.

I can draw a tape diagram. Each box has 4 muffins, so I can draw a unit and label it 4. I can draw a dotted line to estimate the total number of boxes, because I don't yet know how many boxes there are. I do know the total, so I'll label that as 20 muffins. I'll solve by drawing units of 4 in the dotted part of my tape diagram until I have a total of 20 muffins. Then I can count the number of units to see how many boxes of muffins the baker packs.

2. The waiter arranges 12 plates into 4 equal rows. How many plates are in each row?



$$12 \div 4 = \underline{3}$$

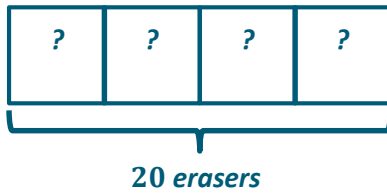
$$3 \times 4 = \underline{12}$$

There are 3 plates in each row.

I can use a number bond to solve. I know that the total number of plates is 12 and that the 12 plates are in 4 rows. Each part in the number bond represents a row of plates.

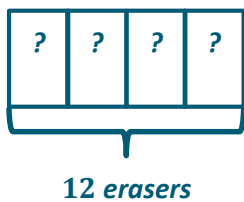
I can divide to solve. I can also think of this as multiplication with an unknown factor.

3. A teacher has 20 erasers. She divides them equally between 4 students. She finds 12 more erasers and divides these equally between the 4 students as well. How many erasers does each student receive?



$$20 \div 4 = \underline{5}$$

I can find the number of erasers each student gets at first when the teacher has 20 erasers.



$$12 \div 4 = \underline{3}$$

I can find how many erasers each student gets when the teacher finds 12 more erasers.

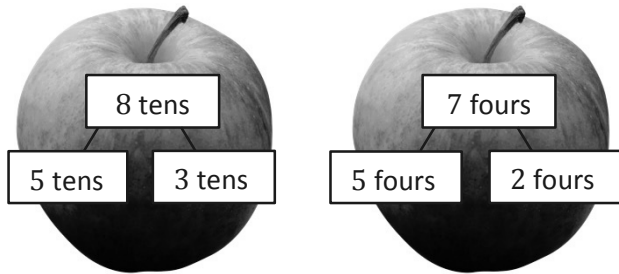
$$5 \text{ erasers} + 3 \text{ erasers} = \underline{8} \text{ erasers.}$$

Each student receives 8 erasers.

I can add to find how many total erasers each student gets.

G3-M1-Lesson 18

1. Match the number bond on an apple with the equation on a bucket that shows the same total.



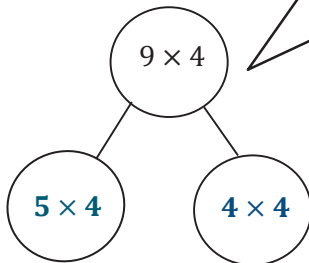
$(5 \times 4) + (2 \times 4) = 28$

$(5 \times 10) + (3 \times 10) = 80$

The number bonds in the apples help me see how I can find the total by adding the two smaller parts together. I can match the apples with the equations below that show the same two parts and total.

2. Solve.

$9 \times 4 = \underline{36}$



I can think of this total as 9 fours. There are many ways to break apart 9 fours, but I'm going to break it apart as 5 fours and 4 fours because 5 is a friendly number.

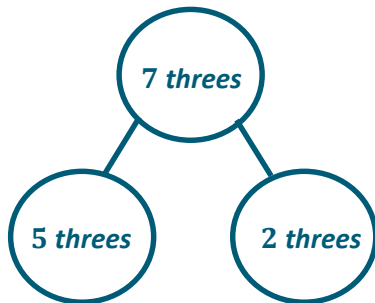
I can use the number bond to help me fill in the blanks. Adding the **products** of these two smaller facts helps me find the product of the larger fact.

$(\underline{5} \times 4) + (\underline{4} \times 4) = 9 \times 4$

$\underline{20} + \underline{16} = \underline{36}$

$9 \times 4 = \underline{36}$

3. Mia solves 7×3 using the break apart and distribute strategy. Show an example of what Mia's work might look like below.



$$5 \text{ threes} + 2 \text{ threes} = 7 \text{ threes}$$

$$(5 \times 3) + (2 \times 3) = 7 \times 3$$

$$15 + 6 = 21$$

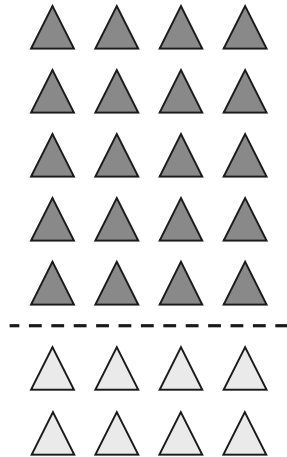
I can use the number bond to help me write the equations. Then I can find the products of the two smaller facts and add them to find the product of the larger fact.

The number bond helps me see the break apart and distribute strategy easily. I can think of 7×3 as 7 threes. Then I can break it apart as 5 threes and 2 threes.

G3-M1-Lesson 19

1. Solve.

$28 \div 4 = \underline{7}$



$(20 \div 4) = \underline{5}$

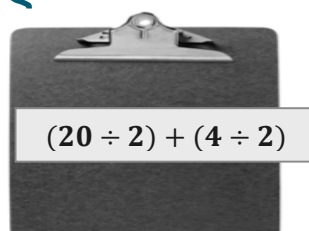
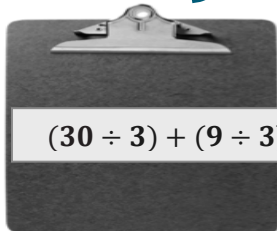
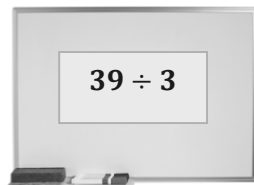
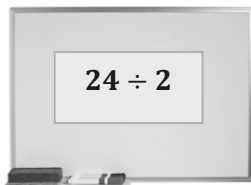
$(8 \div 4) = \underline{2}$

$$\begin{aligned} (28 \div 4) &= (20 \div 4) + (\underline{8} \div 4) \\ &= \underline{5} + \underline{2} \\ &= \underline{7} \end{aligned}$$

This shows how we can add the quotients of two smaller facts to find the quotient of the larger one. The array can help me fill in the blanks.

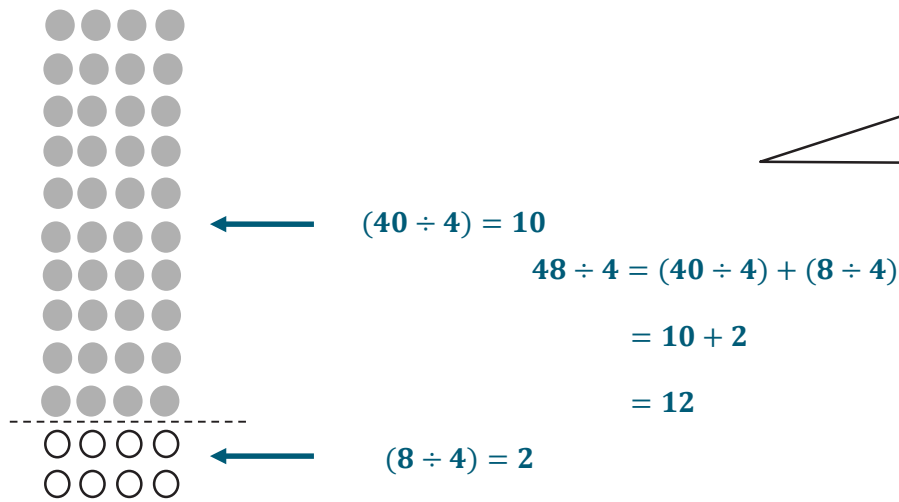
This array shows a total of 28 triangles. I see that the dotted line breaks apart the array after the fifth row. There are 5 fours above the dotted line and 2 fours below the dotted line.

Match equal expressions.



I can match the larger division problem found on the whiteboard to the two smaller division problems added together on the clipboard below.

2. Chloe draws the array below to find the answer to $48 \div 4$. Explain Chloe's strategy.

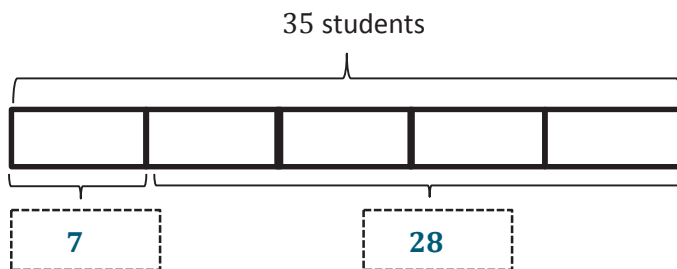


For this problem, I can count the number of rows in this array to check my answer.

Chloe breaks apart 48 as 10 fours and 2 fours. 10 fours equals 40, and 2 fours equals 8. So, she does $40 \div 4$ and $8 \div 4$ and adds the answers to get $48 \div 4$, which equals 12.

G3-M1-Lesson 20

1. Thirty-five students are eating lunch at 5 tables. Each table has the same number of students.
- a. How many students are sitting at each table?



Each unit in my tape diagram represents 1 table. Since there are 35 students and 5 tables, I can divide 35 by 5 to find that each table has 7 students. This tape diagram shows that there are 5 units of 7 for a total of 35.

I know there are a total of 35 students eating lunch at 5 tables. I know each table has the same number of students. I need to figure out how many students are sitting at each table. The unknown is the size of each group.

$$35 \div 5 = 7$$

There are 7 students sitting at each table.

- b. How many students are sitting at 4 tables?

$$4 \times 7 = 28$$

There are 28 students sitting at 4 tables.

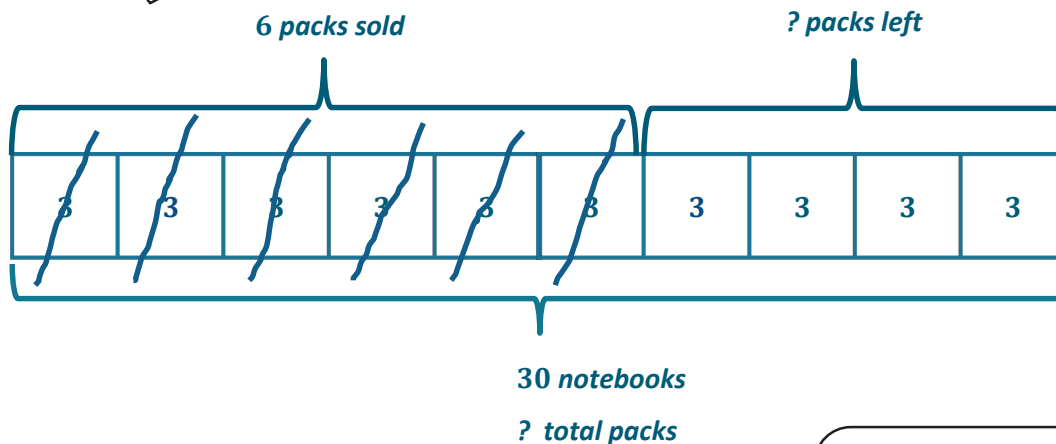
I can write a number sentence and a statement to answer the question.

Since I now know there are 7 students sitting at each table, I can multiply the number of tables, 4, by 7 to find that there are 28 students sitting at 4 tables. I can see this in the tape diagram: 4 units of 7 equal 28.

2. The store has 30 notebooks in packs of 3. Six packs of notebooks are sold. How many packs of notebooks are left?

I can draw a tape diagram that shows 30 notebooks in packs of 3. I can find the total number of packs by dividing 30 by 3 to get 10 total packs of notebooks.

I know the total is 30 notebooks. I know the notebooks are in packs of 3. First I need to figure out how many total packs of notebooks are in the store.



$$30 \div 3 = 10$$

There are a total of 10 packs of notebooks at the store.

Now that I know the total number of packs is 10, I can find the number of packs that are left.

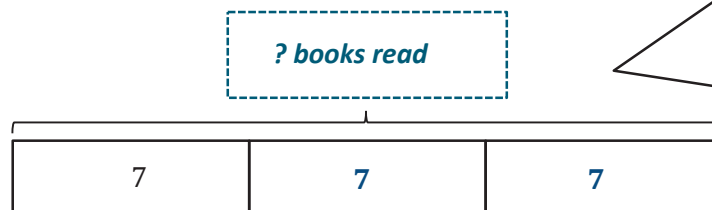
$$10 - 6 = 4$$

There are 4 packs of notebooks left.

I can show the packs that were sold on my tape diagram by crossing off 6 units of 3. Four units of 3 are not crossed off, so there are 4 packs of notebooks left. I can write a subtraction equation to represent the work on my tape diagram.

G3-M1-Lesson 21

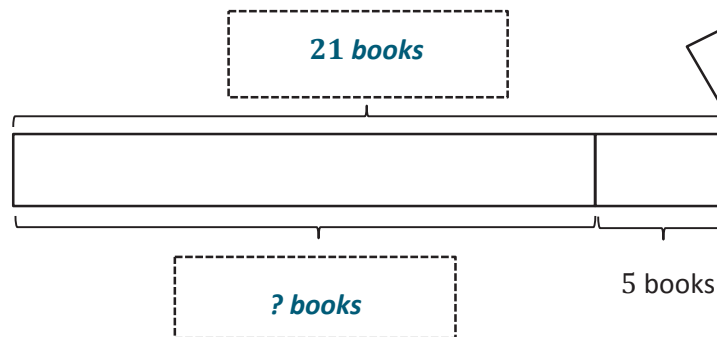
1. John has a reading goal. He checks out 3 boxes of 7 books from the library. After finishing them, he realizes that he beat his goal by 5 books! Label the tape diagrams to find John's reading goal.

books read

Each unit in this tape diagram represents 1 box of John's library books. The number of books in each box (the size) is 7 books. So I can multiply 3×7 to find the number of books John reads.

$$3 \times 7 = 21$$

John reads 21 books.

reading goal

I can draw a tape diagram that shows 21 as the total because John reads 21 books. I can label one part as 5 because John beat his reading goal by 5 books. When I know a total and one part, I know I can subtract to find the other part.

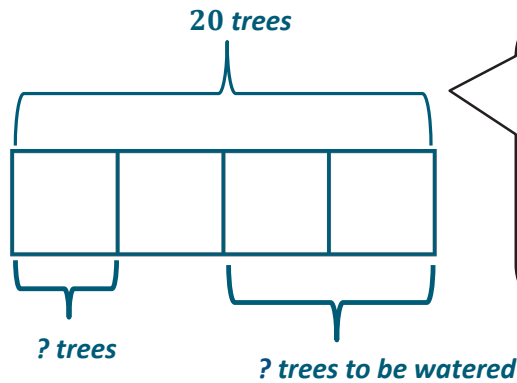
$$21 - 5 = 16$$

John's goal was to read 16 books.

I can check back to see if my statement answers the question.

2. Mr. Kim plants 20 trees around the neighborhood pond. He plants equal numbers of maple, pine, spruce, and birch trees. He waters the spruce and birch trees before it gets dark. How many trees does Mr. Kim still need to water? Draw and label a tape diagram.

I know Mr. Kim plants a total of 20 trees. He plants an equal number of 4 types of trees. This is the number of groups. So, the unknown is the size of each group.



I can draw a tape diagram that has 4 units to represent the 4 types of trees. I can label the whole as 20, and I can divide 20 by 4 to find the value of each unit.

I know that Mr. Kim waters the spruce and birch trees, so he still needs to water the maple and pine trees. I can see from my tape diagram that 2 units of 5 trees still need to be watered. I can multiply 2×5 to find that 10 trees still need to be watered.

$$20 \div 4 = 5$$

Mr. Kim plants 5 of each type of tree.

$$2 \times 5 = 10$$

Mr. Kim still needs to water 10 trees.

$$20 - 10 = 10$$

Mr. Kim still needs to water 10 trees.

Or I can subtract the number of trees watered, 10, from the total number of trees to find the answer.