SAVVAS

Grade 3

Let's Investigate Take and Teach

enVision+ MATHEMATICS

Real-World Math. Real-World Ready.

Let's Investigate

Lesson

4-2

Relate Multiplication and Division Facts

FOCUS

Mathematics Objective Investigate ways to use multiplication to solve division equations.

Language Objective Explain, orally and in writing, the connection between multiplication and division.

Essential Understanding Knowing the relationship between multiplication and division facts can be helpful in solving problems involving multiplication and division.

COHERENCE

Look Back Previously, students worked with multiplication facts with factors 0–10, learned the meanings of division, and related multiplication and division.

This Lesson Students use what they know about the inverse relationship between multiplication and division to solve problems.

Look Ahead The next four lessons explicitly develop strategies for dividing with 2, 3, 4, 5, 6, 7, 8, 9, 0, and 1.

Cross-Cluster Connection Understanding division as an unknown-factor problem connects to work with multiplication and division in previous topics.

RIGOR

Conceptual Understanding Students find solutions for a math problem by using what they have learned about the inverse relationship between multiplication and division. They use tools and strategies of their choice to make sense of the problem. They recognize the relationship between multiplication and division.

Vocabulary

none

Materials

- Two-color counters (or Teaching Tool 35), optional
- Multiplication table (or Teaching Tool 17), optional
- $\frac{1}{4}$-Inch grid paper (or Teaching Tool 18), optional

Student Resources

Family Engagement

Intervention System (IS)
B44 Arrays and Multiplication
B46 Multiplying by 2 and 5
B51 Multiplying by 4
B55 Meanings for Division

Teacher Resources

enVision on the Go

Exit Ticket Support for using the Exit Ticket is available online.

Step 1 Investigate

10-25 min

Investigate Scout Observational Assessment

Name _____

Relate Multiplication and Division Facts

Let's Investigate

Lesson 4-2

I can ... investigate ways to divide using multiplication facts.

Share the Cards

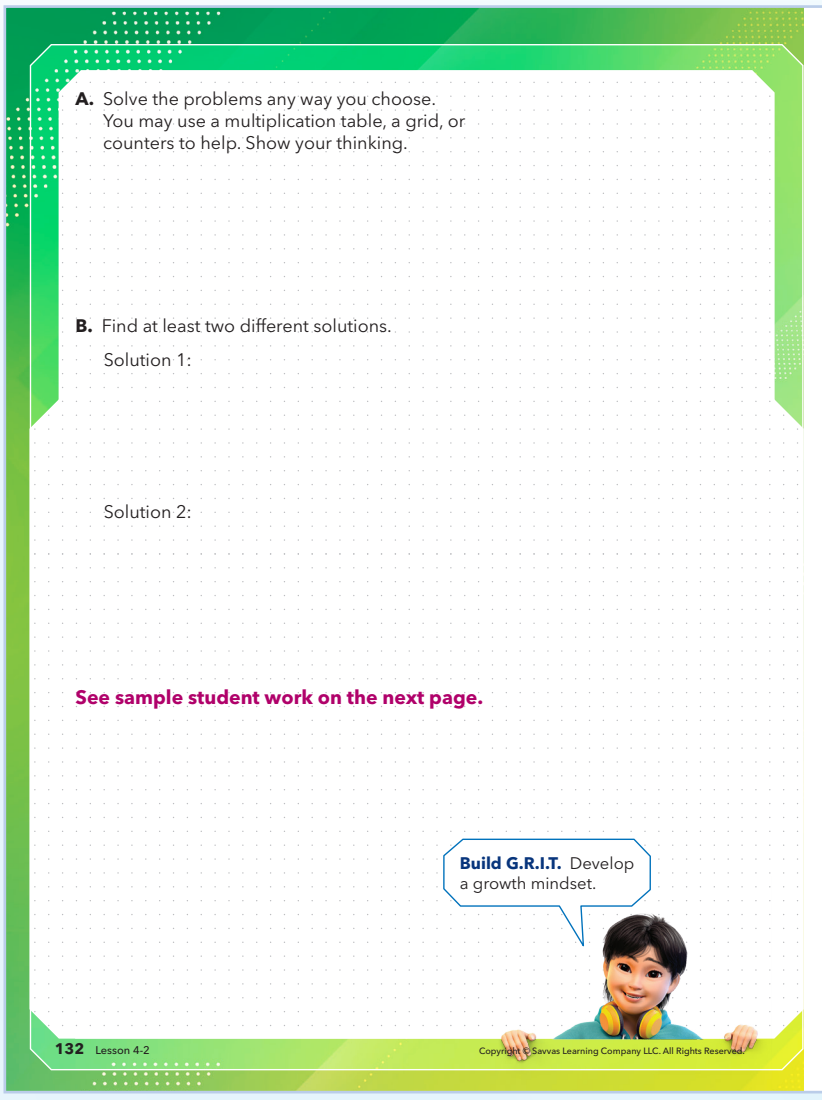
Alex and Naomi have some trading cards in a box that they will share with some friends. They can share the cards equally with 4 friends with none left. They can share the cards equally with 5 friends with none left.

They have fewer than 100 cards to share.

A How many cards might be in the box?

B How many solutions are possible? Can you find at least two different solutions?

Copyright © Savvas Learning Company LLC. All Rights Reserved.



A. Solve the problems any way you choose. You may use a multiplication table, a grid, or counters to help. Show your thinking.

B. Find at least two different solutions.

Solution 1:

Solution 2:

See sample student work on the next page.

Build G.R.I.T. Develop a growth mindset.

Copyright © Savvas Learning Company LLC. All Rights Reserved.

MTP Anticipate

Anticipate students' solution strategies. Think of various ways students might use their prior knowledge to solve the problems. See the next page for sample student work.

Introduce the Investigation

Use the Slow Reveal Slides You might use the slides to reveal part of the information. Then ask: What do you notice? What do you wonder?

Elevate Student Voice: Engage Students in the Context Have students bring their own unique experiences and ideas to the situation by using prompts like these:

- Tell about cards or other things that you collect.
- Describe any ways in which you share collections with friends.

Check for Understanding

MLR6 Three Reads

Have students read the task by themselves. Ask:

- What is the task about?
- What are Alex and Naomi sharing?

Have students read the task a second time. Ask:

- What information is given in the task?
- Why is the information important?

Have students read the task a third time. Ask:

- What is the task asking you to find?
- What questions do Alex and Naomi ask?

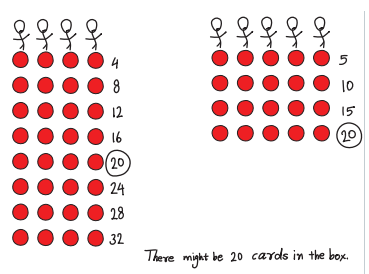
Step 1 Investigate *continued*

Sample Student Work

Share the Cards Problem A

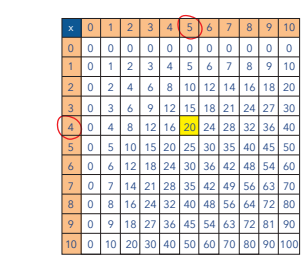
Find a number of cards less than 100 that can be shared with 4 or 5 friends equally with no cards left (find a multiple of 4 and 5 that is less than 100).

- **Elijah drew 4 friends.** Then he used counters to represent giving each friend one card, then another card, then another, and so on. He labeled each row with multiples of 4s. He repeated the process for 5 friends. He circled the multiple of 20 in each list.



You might ask Elijah: Why did you stop at 20 when you were sharing with 5 friends? [Listen for "I saw that 20 was also a number I wrote when sharing with 4 friends."]

- **Fatima used a multiplication table.** She circled the factors of 4 and 5 in the table and saw that they meet at 20.



×	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	28	32	36	40
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

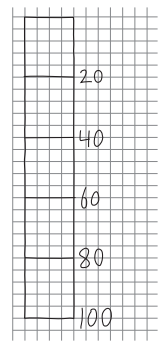
There might be 20 cards in the box.

You might ask Fatima: How did you know to circle 4 and 5? [Listen for "I knew 4 and 5 had to be factors of the number of cards because the number of cards can be shared equally with 4 or 5 friends with none left."]

Share the Cards Problem B

Find all possible solutions for a number of cards less than 100 that can be shared with 4 or 5 friends equally with no cards left (find common multiples of 4 and 5 that are less than 100).

- **Allison used grid paper to show a 5 by 4 rectangle.** She wrote 20 next to rectangle. Then she drew another 5 by 4 rectangle and wrote 40. She continued until she got to 100. **Misconception** Allison didn't realize the number of cards has to be less than 100.



You might ask Allison: What do we know about the number of cards Carlos and Emily shared? [Listen for "They can share equally with 4 friends or 5 friends with none left. They have fewer than 100 cards to share. Oh, 100 cards can't be one of the solutions."]

- **Noshi skip counted by 4s to 96.** Then he skip counted by 5s to 95. He circled all the multiples that 4s and 5s have in common.

4 friends: 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, 56, 60, 64, 68, 72, 76, 80, 84, 88, 92, 96

5 friends: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95

There are 4 possible solutions. There might be 20 or 40 or 60 or 80 cards in the box.

You might ask Noshi: How did you know you could write the multiples? [Listen for "I knew the cards could be shared equally with 4 friends or 5 friends. That means I can skip count by those numbers because they are factors. I looked for multiples that were the same."]

Step 1 Investigate *continued*

MTP Monitor

Monitor Students at Work Ask questions to assess and advance students' thinking.

Assessing Questions

Questions for Students to Understand Their Thinking

- Can you tell/show me what you did?
- What do those counters/pictures/numbers mean?
- How did you know your strategy would work?

Questions for You as You Observe

- How are students representing the cards?
- What prior knowledge are they using to help find the possible solutions?

Advancing Questions

Questions to Ask Students Who Need Help

- If students need additional support to get started, ask: How can you show equal shares of the cards?
- If students' work is incorrect, ask: How did you get that answer? Listen for understandings and build on what they know.

Questions to Ask Students to Think More Deeply

- Is there another way to solve the problem?
- How could you check your work to make sure your answer is correct?

Early Finishers

Ask: What possible solutions would there be if Alex and Naomi could also share the cards equally with 8 friends with none left? How do you know? [Sample answer: There would be two solutions, 40 and 80. I know because 40 and 80 are the only solutions that are also multiples of 8.]

MTP Select and Sequence

Select and Sequence Students' Solutions for them to present with the goal of building understanding of key concepts.

Start with solutions that use concrete representations or pictures. (Elijah)

Then show solutions that recognize 4 and 5 as factors and skip count or multiply. (Fatima, Noshi)

Finally, show solutions with 100 included to reinforce the concept that "fewer than" does not include the cited number. (Allison)

Step 2 Connect

10-55 min

MTP Connect

Name _____

Connect

1. **Make Sense and Persevere** What strategy did you use to find how many cards might be in the box?
   Sample answer: I looked for products of 4s facts and 5s facts that were the same. I found 20 and 40 both have 4 as a factor and 5 as a factor.

2. **Use Appropriate Tools** Which tool did you find most useful to answer each question? Did you use the same tool for both questions?
   Sample answer: Both times I used a multiplication table because it shows all the products that have 4 or 5 as factors.

3. **Model with Math** One friend who received 40 cards is arranging his cards in an array. What might the array look like? Draw the array. Then describe it.
   Check students' arrays. Sample answer: It could have 5 rows with 8 cards in each row.

Talk About Ideas What is a good way to find equal shares of a quantity of objects?

Copyright © Savvas Learning Company LLC. All Rights Reserved.

Connect Solution Strategies Discuss students' work. Ask how the solutions are similar and different. Help students see that Fatima multiplied to find a possible number of cards and Noshi skip counted to find all possible numbers of cards. But they both thought about 4 and 5 as factors because they knew the number of cards could be divided equally with no cards left.

Connect to Key Concepts Use the Connect questions to build understanding of the key concept at the top of the next page.

MTP Talk About Ideas

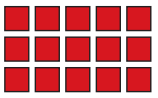
Have students engage in a think-pair-share to discuss ways to find equal shares of a quantity of objects. Listen for students who say that they would use an array or multiplication table and for students who say that they would divide or think about skip counting and multiplication.

Step 3 Practice and Problem Solving

10-15 min

Interactive Practice Adaptive Practice

Write a multiplication fact and a division fact that match the array.



The array shows that 3 rows with 5 in each row equals 15.

$3 \times 5 = 15$

Multiplication can help us solve division problems.

The array also shows that 15 can be arranged into 3 rows of 5.

$15 \div 3 = 5$

Practice and Problem Solving

Lesson Help

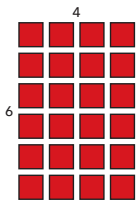
In **4** and **5**, write a multiplication fact that can help you solve the division problem.

4. There are 45 sheep in 5 different pastures. Each pasture has the same number of sheep. How many sheep are in each pasture?
Sample answer: $9 \times 5 = 45$

5. Gianna planted 32 plants in a flower bed. She planted them in rows with 8 plants in each row. How many rows did Gianna plant?
Sample answer: $8 \times 4 = 32$

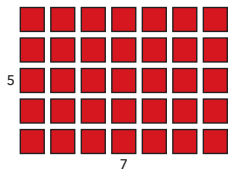
In **6–7**, write a multiplication fact and a related division fact that match the array.

6.



Sample answer: $6 \times 4 = 24$ and $24 \div 6 = 4$

7.



Sample answer: $5 \times 7 = 35$ and $35 \div 5 = 7$

Assessment Practice

8. Which multiplication fact helps you find the missing number?
$12 \div 2 = \square$

Ⓐ $2 \times 10 = 20$ Ⓒ $2 \times 3 = 6$
Ⓑ $6 \times 2 = 12$ Ⓓ $5 \times 6 = 30$

9. Which multiplication fact helps you find the missing number? 3.OA.6
$20 \div 5 = \square$

Ⓐ $2 \times 5 = 10$ Ⓒ $5 \times 6 = 30$
Ⓑ $5 \times 8 = 40$ Ⓓ $4 \times 5 = 20$

134 Lesson 4-2

Copyright © Savvas Learning Company LLC. All Rights Reserved.

MLL Multilingual Learners Reading

Pasture in Item 4 and *flower bed* in Item 5 may be unfamiliar to students.

Emerging Show pictures of a pasture and a flower bed to students. Then, present the following sentences and have students fill in the missing words. The sheep are in the _____. Gianna plants flowers in the _____.

Expanding Have students read each problem and then sketch a picture of what they think a pasture and flower bed look like. Have students share their ideas with a partner. Students should share what familiar words in each problem helped them to think about the unfamiliar words.

Bridging Ask students to describe other contexts where they might find the words *pasture* and *flower bed*.

Reflection

Have students look at the array at the top of the page. How does the array represent both multiplication and division. [There are 3 rows with 5 in each row. That's $3 \times 5 = 15$. If we start with the total, 15, the array shows 15 arranged evenly in 3 rows with 5 in each row. That's $15 \div 3 = 5$.] How are multiplication and division similar and different? [They both have a number of groups, group size, and total. When we multiply, we find the total. When we divide, we know the total.] How can multiplication help us solve division problems? [We can think about known multiplication facts. For example, if we know $3 \times 5 = 15$, we can figure out $15 \div 3$ by thinking about $3 \times$ ____ $= 15$.]

Error Intervention Items 4 and 5
If students have difficulty writing the multiplication fact, **then** have them read the problem again and write the division fact that represents the problem. Writing the division fact may help them to see what is known and unknown. Ask: What multiplication fact helps to solve the problem?

Items 6 and 7 You may wish to challenge students to write the two multiplication facts and two related division facts that match the array.

MTP Quick Check

Formative Assessment

Check marks indicate items for prescribing differentiation. Items 5 and 6: up to 2 points each. Item 9: 1 point. The online Quick Check is auto scored and auto prescribes differentiation.

Step 4 Assess and Differentiate

10-15 min

Additional Practice

Name _____

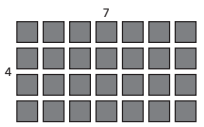
Relate Multiplication and Division Facts

Additional Practice **4-2**

Another Look!

Video

Write a multiplication fact and a division fact that match the array.



The array shows that 4 rows with 7 in each row equals 28.

$4 \times 7 = 28$

The array also shows that 28 can be arranged into 4 rows with 7 in each row.

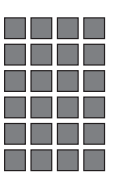
$28 \div 4 = 7$

Model with Math In **1-3**, write a division equation that matches the problem and the multiplication fact that can help you solve the division problem.

1. Ms. Hill bought 35 scissors for students in her art classes. The scissors came in packages with 5 scissors. How many packages did she buy?
   $35 \div 5 = ?$
   $? \times 5 = 35$
2. Julio used 48 pieces of balsa wood to make some bridges. He used 8 pieces for each bridge. How many bridges did Julio make?
   $48 \div 8 = ?$
   $? \times 8 = 48$
3. Johan has a bowl of 54 blueberries. He will share the blueberries equally among 5 friends and himself. How many blueberries will each person have?
   $54 \div 6 = ?$
   $6 \times ? = 54$
4. **Higher Order Thinking** 32 students are going on a field trip. They will be in equal groups. What are two possible groupings of students? Write a multiplication equation and a division equation for one of the groupings.
   Sample answer: 4 groups of 8 and 8 groups of 4; $32 \div 4 = 8$; $8 \times 4 = 32$

Copyright © Savvas Learning Company LLC. All Rights Reserved.

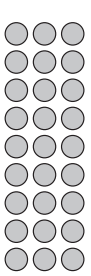
Look for Relationships In **5-8**, write a multiplication fact and a related division fact to match the array.

5. 

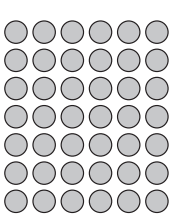
   $6 \times 4 = 24$ or $4 \times 6 = 24$;
   $24 \div 6 = 4$ or $24 \div 4 = 6$

6.

   $3 \times 5 = 15$ or $5 \times 3 = 15$;
   $15 \div 3 = 5$ or $15 \div 5 = 3$

7. 

   $9 \times 3 = 27$ or $3 \times 9 = 27$;
   $27 \div 9 = 3$ or $27 \div 3 = 9$

8. 

   $7 \times 6 = 42$ or $6 \times 7 = 42$;
   $42 \div 7 = 6$ or $42 \div 6 = 7$

Assessment Practice

9. Which multiplication fact helps you find the missing number?
   $21 \div 3 = \square$
   Ⓐ $2 \times 3 = 6$
   Ⓑ $7 \times 3 = 21$
   Ⓒ $3 \times 3 = 9$
   Ⓓ $5 \times 3 = 15$

10. Which multiplication fact helps you find the missing number?
    $36 \div 6 = \square$
    Ⓐ $2 \times 6 = 12$
    Ⓑ $3 \times 6 = 18$
    Ⓒ $5 \times 6 = 30$
    Ⓓ $6 \times 6 = 36$

Copyright © Savvas Learning Company LLC. All Rights Reserved.

Differentiation Library

The **Differentiation Library** at the beginning of this topic shows the differentiation options available, each of which can be appropriate for all students. However, based on the **Quick Check** results, you may prescribe:

0–3 points: Intervention Activity or Reteach to Build Understanding Activity

4–5 points: Enrichment Activity

In addition, **Multilingual Learners** may benefit from the Build Mathematical Literacy Activity.

Intervention Activity

Materials Two-color counters (or Teaching Tool 35), optional

- Present the following problems one at a time. Students should work in pairs to solve each problem. Encourage them to use counters, draw a picture, or use a strategy of their choice. Support pairs as they work.

  Chloe wants to share some of her stickers equally with 2 friends with none left. Chloe has fewer than 24 stickers to share. How many stickers could Chloe have to share?

  Chloe wants to share some of her stickers equally with 3 friends with none left. Chloe has fewer than 24 stickers to share. How many stickers could Chloe have to share?

- Discuss how students determined their answers.
- Ask: What are all possible amounts of stickers that can work with either 2 or 3 friends? How many stickers could Chloe have to share?
- Provide time for pairs to find how many stickers Chloe could have to share. Make connections between the first two problems and the third problem.

2 friends: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22

3 friends: 3, 6, 9, 12, 15, 18, 21

Chloe could have 6, 12, or 18 stickers to share.

Video Tutorial

Another Look Video

Intentional Blank Page

Name _____

Relate Multiplication and Division Facts

Let's Investigate

Lesson 4-2

I can ... investigate ways to divide using multiplication facts.

Share the Cards

Alex and Naomi have some trading cards in a box that they will share with some friends. They can share the cards equally with 4 friends with none left. They can share the cards equally with 5 friends with none left.

They have fewer than 100 cards to share.

Copyright © Savvas Learning Company LLC. All Rights Reserved.

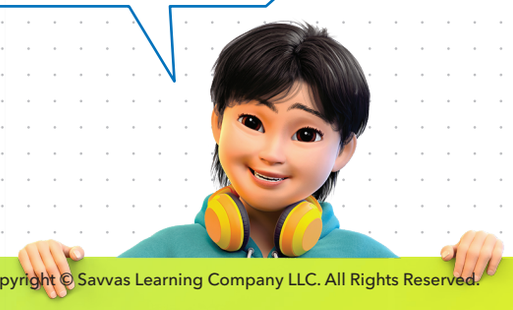
A. Solve the problems any way you choose. You may use a multiplication table, a grid, or counters to help. Show your thinking.

B. Find at least two different solutions.

Solution 1:

Solution 2:

Build G.R.I.T. Develop a growth mindset.



Copyright © Savvas Learning Company LLC. All Rights Reserved.

Name _____

Connect

1. **Make Sense and Persevere** What strategy did you use to find how many cards might be in the box?

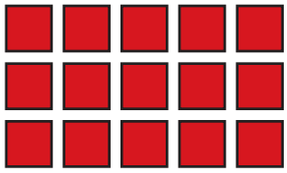
2. **Use Appropriate Tools** Which tool did you find most useful to answer each question? Did you use the same tool for both questions?

3. **Model with Math** One friend who received 40 cards is arranging his cards in an array. What might the array look like? Draw the array. Then describe it.

Talk About Ideas What is a good way to find equal shares of a quantity of objects?

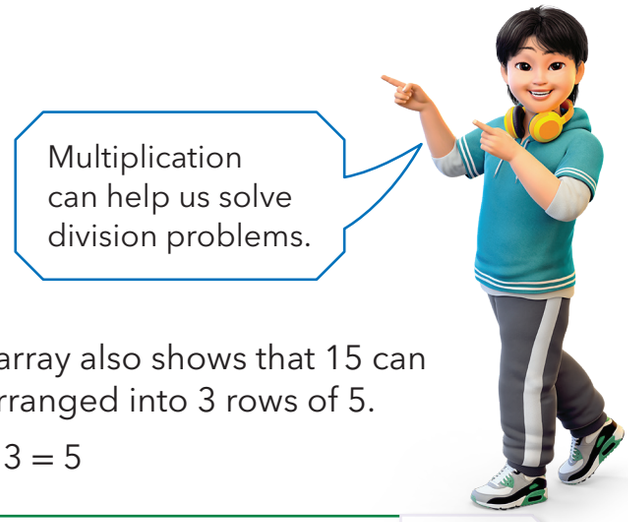
Copyright © Savvas Learning Company LLC. All Rights Reserved.

Write a multiplication fact and a division fact that match the array.



The array shows that 3 rows with 5 in each row equals 15.

$3 \times 5 = 15$



The array also shows that 15 can be arranged into 3 rows of 5.

$15 \div 3 = 5$

Practice and Problem Solving

Lesson Help

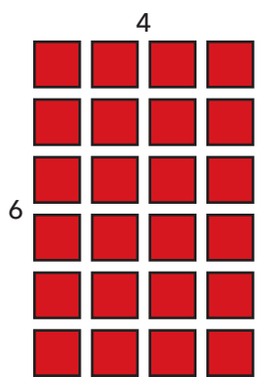
In **4** and **5**, write a multiplication fact that can help you solve the division problem.

4. There are 45 sheep in 5 different pastures. Each pasture has the same number of sheep. How many sheep are in each pasture?

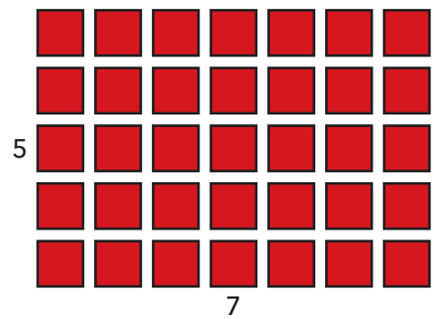
5. Gianna planted 32 plants in a flower bed. She planted them in rows with 8 plants in each row. How many rows did Gianna plant?

In **6–7**, write a multiplication fact and a related division fact that match the array.

6.



7.



Assessment Practice

8. Which multiplication fact helps you find the missing number? 3.OA.6

$12 \div 2 = \square$

Ⓐ $2 \times 10 = 20$ Ⓒ $2 \times 3 = 6$

Ⓑ $6 \times 2 = 12$ Ⓓ $5 \times 6 = 30$

9. Which multiplication fact helps you find the missing number? 3.OA.6

$20 \div 5 = \square$

Ⓐ $2 \times 5 = 10$ Ⓒ $5 \times 6 = 30$

Ⓑ $5 \times 8 = 40$ Ⓓ $4 \times 5 = 20$

Copyright © Savvas Learning Company LLC. All Rights Reserved.