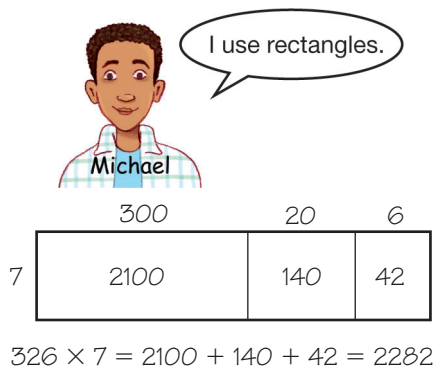


# LETTER HOME

## Estimation and Efficient Computation

Dear Family Member:

In this unit the focus is on using efficient strategies to add, subtract, and multiply numbers with more than one digit. Often when we think of arithmetic, we think of a single procedure that we learned by rote. An important part of computing efficiently is being able to solve problems in several different ways and then choosing the best way for a given situation. The students in the pictures below show several different ways to multiply.



Michael says, "I use rectangles."

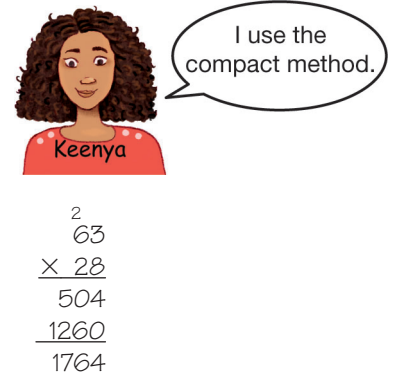
	300	20	6
7	2100	140	42

$326 \times 7 = 2100 + 140 + 42 = 2282$

$$\begin{aligned} 72 \times 99 &= (72 \times 100) - 72 \\ &= 7200 - 72 \\ &= 7128 \end{aligned}$$



Ming says, "I use simpler numbers."



Keenya says, "I use the compact method."

$$\begin{array}{r} \phantom{0}^2 63 \\ \times 28 \\ \hline 504 \\ 1260 \\ \hline 1764 \end{array}$$

In this unit your child will review and practice using strategies for addition, subtraction, and multiplication and will apply these strategies in contexts that demand multistep problem solving, including problems that ask them to find the volume of rectangular prisms.

Computing efficiently also means being able to estimate when appropriate to the situation. For example, estimation works for checking the reasonableness of an answer. It also makes sense when an exact answer is not needed or when an exact answer is hard to find.

In this unit your child will review what they have learned about area and perimeter and connect this understanding to the use of multiplication to find the area of rectangles and triangles and the volume of rectangle prisms.

You can help your child learn more about efficient computation with the following activities:

- **Play the Digits Game.** Ask your child to play the Digits Game with you. There are two versions of this game, one that is focused on addition and subtractions, and one that focuses on multiplication.
- **Two Ways to Solve.** Give your child an addition, subtraction, or multiplication problem involving numbers with more than one digit. Ask him or her to solve it in at least two ways.
- **Find the Volume.** Ask your child to explain how to find the volume of small rectangular boxes such as a tissue box or cereal box.

## Math Facts and Mental Math

This unit continues the systematic review and assessment of the multiplication and division facts.

**Multiplication Facts.** Students review all the multiplication facts to maintain and increase fluency and to learn to apply multiplication strategies to larger numbers.

You can help your child review these facts using the flash cards that are sent home or by making a set of flash cards from index cards or scrap paper. Study facts in small groups each night and focus on only those facts your child needs to learn. As your child goes through the flash cards, put the cards in three stacks: Facts I Know Quickly, Facts I Can Figure Out, and Facts I Need to Learn.

For the Facts I Need to Learn, work on strategies for figuring them out. If there are many multiplication facts that your child still needs to learn, divide them into smaller groups of facts. Choose groups of facts that lend themselves to the use of the same strategy and focus on one group at a time.

For Facts I Can Figure Out, use the flash cards to practice the facts for fluency.

For Facts I Know Quickly, help your child use mental math strategies to multiply 10s and 100s. You can also help your child extend and deepen their understanding by asking him or her to choose a multiplication fact that was difficult to learn and describe the strategies used for learning the fact.

**Division Facts.** Students review the division facts for 9s to maintain and increase fluency and to learn to apply multiplication and division strategies to larger numbers.

You can help your child review the division facts using the flash cards that are sent home or by making a set of flash cards from index cards or scrap paper. Study facts in small groups each night. As your child goes through the flash cards, put the cards in three stacks: Facts I Know Quickly, Facts I Can Figure Out, and Facts I Need to Learn.

For the Facts I Need to Learn, work on strategies for figuring them out. Good strategies include:

Use ten. To solve  $9 \times 9$ , think  $9 \times 10 = 90$  and  $90 - 9 = 81$ .

Use fact families. To solve  $72 \div 9$ , think  $\square \times 9 = 72$ . Since  $8 \times 9 = 72$ , then  $72 \div 9 = 8$ .

Sincerely,

# Unit 4: Home Practice

## Part 1 Triangle Flash Cards: Nines

Study for the quiz on the multiplication and division facts for the nines. Take home your *Triangle Flash Cards: 9s* and your list of facts you need to study. Ask a family member to choose one flash card at a time. To quiz you on a multiplication fact, he or she should cover the corner containing the highest number. (The highest number on each card is lightly shaded.) This number will be the answer to the multiplication fact. Multiply the two uncovered numbers.

To quiz you on a division fact, your family member can cover one of the unshaded numbers. Then use the two uncovered numbers to solve the division fact.

Ask your family member to mix up the multiplication and division facts. He or she should sometimes cover the highest number and sometimes cover one of the smaller numbers.

Your teacher will tell you when the quiz on the nines will be.

## Part 2 Caterpillar to Chrysalis

A class observed 6 caterpillars and kept track of how many days it took for each caterpillar to turn into a chrysalis. A chrysalis is the hard-shelled stage that comes before the caterpillar turns into a butterfly.

Days to chrysalis: 10, 8, 8, 8, 10, 10

1. What is the median number of days it took for the caterpillars to change into chrysalises?

The class then kept track of how many days it took for each chrysalis to turn into a butterfly.

Days to butterfly: 15, 15, 17, 15, 17, 14

2. What is the median number of days it took for the chrysalises to turn into butterflies?

### Part 3 Problem Solve with Data

A class made paper airplanes and kept track of how far the paper airplanes flew. Each student performed three trials and recorded the distance in centimeters.

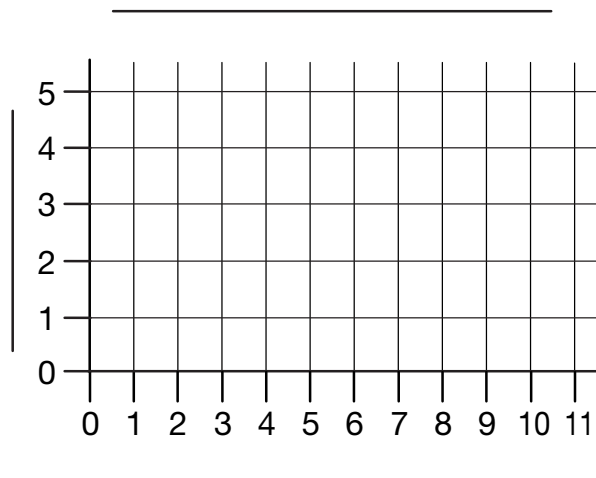
- Write the median distance that each student's airplane flew.

**Flight Distance for Paper Airplanes**

Student	Trial 1	Trial 2	Trial 3	Median Distance
Irma	13 cm	11 cm	8 cm	
Jacob	11 cm	9 cm	11 cm	
Grace	10 cm	8 cm	9 cm	
Ming	4 cm	3 cm	5 cm	
Romesh	3 cm	5 cm	2 cm	
John	5 cm	4 cm	2 cm	
Keenya	9 cm	8 cm	9 cm	
Kit	5 cm	7 cm	10 cm	

- Make a bar graph of the median distances in trial flights. Remember to label each axis.

Median Distance	Tallies	Number
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		



- Make a paper airplane and fly it three times. Measure the distance the airplane flies each time. What is the median distance in centimeters that your airplane flew? How does your median compare to the class's data?

**Part 4** Addition and Subtraction Practice

Use paper and pencil or mental math to solve these problems. Choose an efficient method based on the numbers in the problem. Remember to do a quick estimate and look at your answer to be sure it makes sense. Use the *Addition Strategies Menu* and *Subtraction Strategies Menu* in the *Student Guide Reference* section.

1. A. 
$$\begin{array}{r} 203 \\ + 597 \\ \hline \end{array}$$

B. 
$$\begin{array}{r} 640 \\ - 235 \\ \hline \end{array}$$

C. 
$$\begin{array}{r} 3210 \\ + 2345 \\ \hline \end{array}$$

D. 
$$\begin{array}{r} 6753 \\ + 1985 \\ \hline \end{array}$$

E. 
$$\begin{array}{r} 7625 \\ - 4434 \\ \hline \end{array}$$

F. 
$$\begin{array}{r} 614 \\ 992 \\ + 43 \\ \hline \end{array}$$

2. Explain how you can solve Question 1A using mental math.
3. Show a second method for solving Question 1D.
4. Explain your estimation strategy for Question 1F.

**Part 5** Multiplication Strategies

Solve. Estimate to make sure your answers are reasonable. Use the *Multidigit Multiplication Strategies Menu* in the *Student Guide Reference* section.

1. **A.**  $32 \times 6 =$       **B.**  $725 \times 3 =$       **C.**  $682 \times 4 =$       **D.**  $199 \times 6 =$

**E.**  $25 \times 32 =$       **F.**  $42 \times 36 =$       **G.**  $19 \times 56 =$       **H.**  $72 \times 31 =$

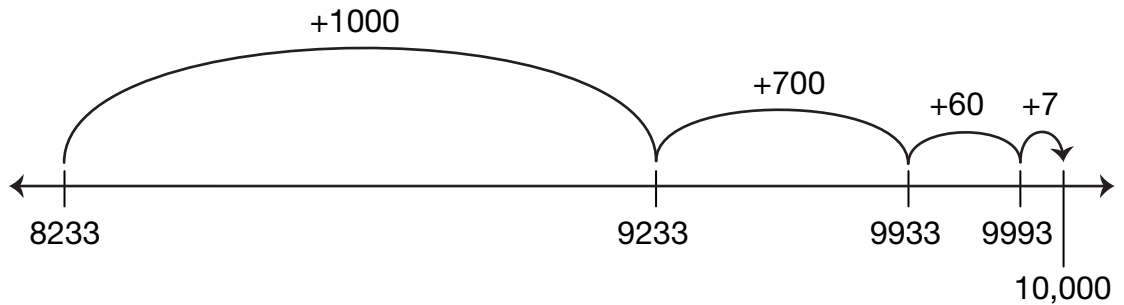
**I.**  $83 \times 41 =$       **J.**  $92 \times 65 =$       **K.**  $33 \times 69 =$       **L.**  $75 \times 25 =$

- Choose one of the problems above and show how you solve it using the expanded-form method.
- Choose one of the problems above and show how you solve it using the all-partials method.
- Choose one of the problems above and show how you found a reasonable estimate.

**Part 6** Number Line Problems

Use the number line to answer the questions.

1.



A. Write a number sentence to show how the hopper moved.

B. Show another way the hopper can move from 8233 to get to 10,000. Write a number sentence to match.

2. For the starting numbers below, show how a base-ten hopper can move to get to 10,000. Write a number sentence for each.

A. 8230

B. 6056

C. 3897

## Part 7 Connect Multiplication Strategies

Finish each problem using the strategy that was started. Use the *Multidigit Multiplication Strategies Menu* in the *Student Guide Reference* section.

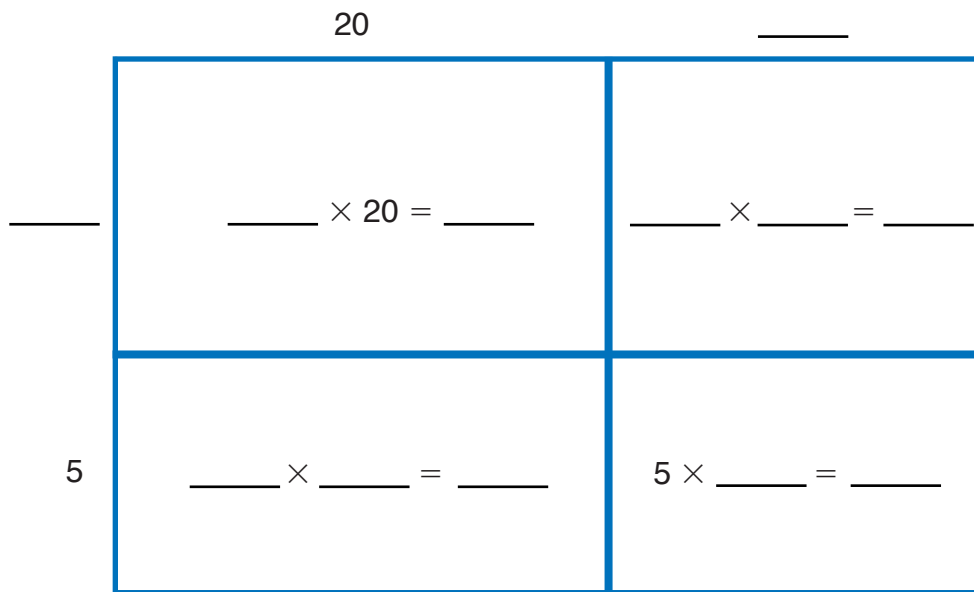
1. Grace and Maya needed to solve  $45 \times 28$ .

A. Grace started the problem this way. Finish it using her method.

$$\begin{array}{r} 28 \\ \times 45 \\ \hline 800 \\ 320 \end{array}$$

B. Show where Grace got 800 and 320.

2. A. Maya used rectangles to solve the same problem. She started this way. Fill in the blanks and complete the problem.



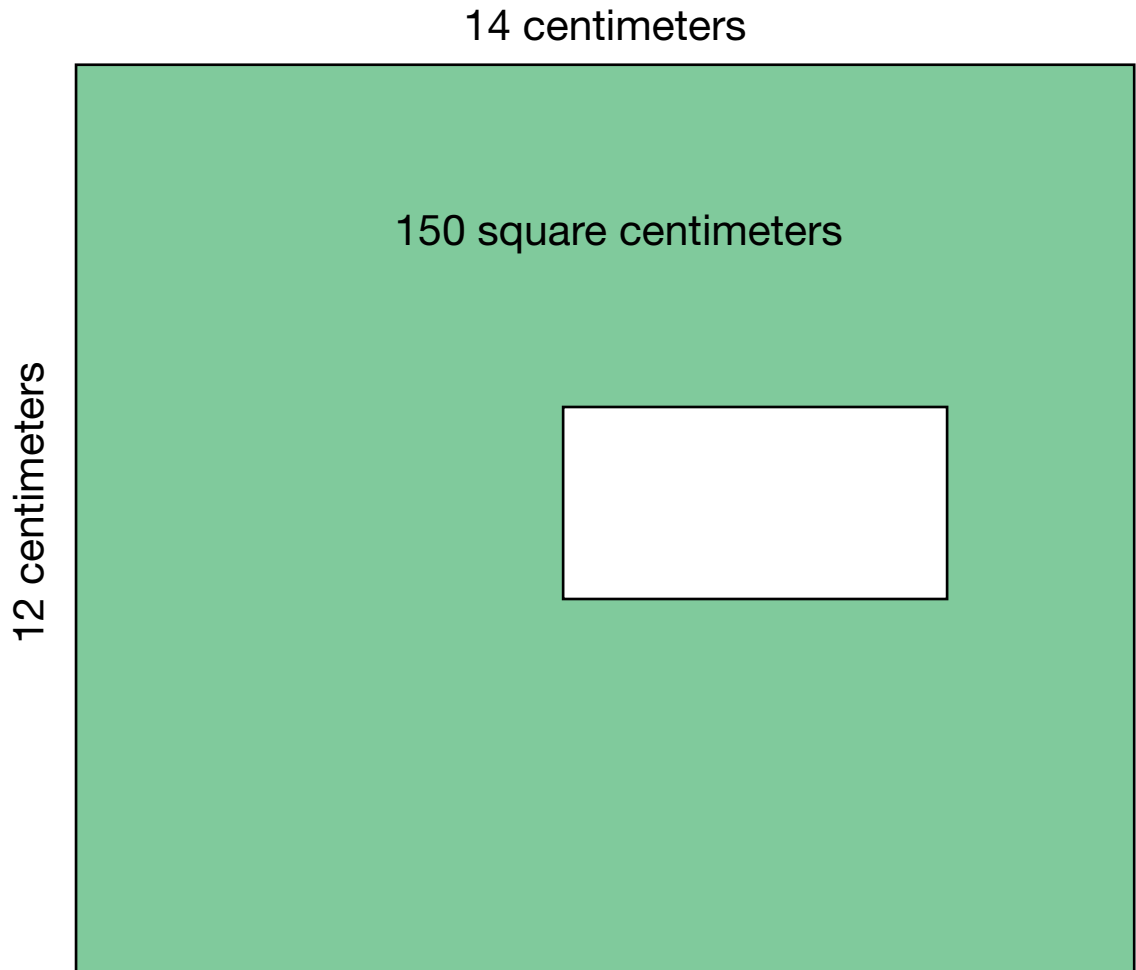
$45 \times 28 =$

B. Compare Grace's and Maya's methods. How are they alike? How are they different?



**Part 8 Find The Area**

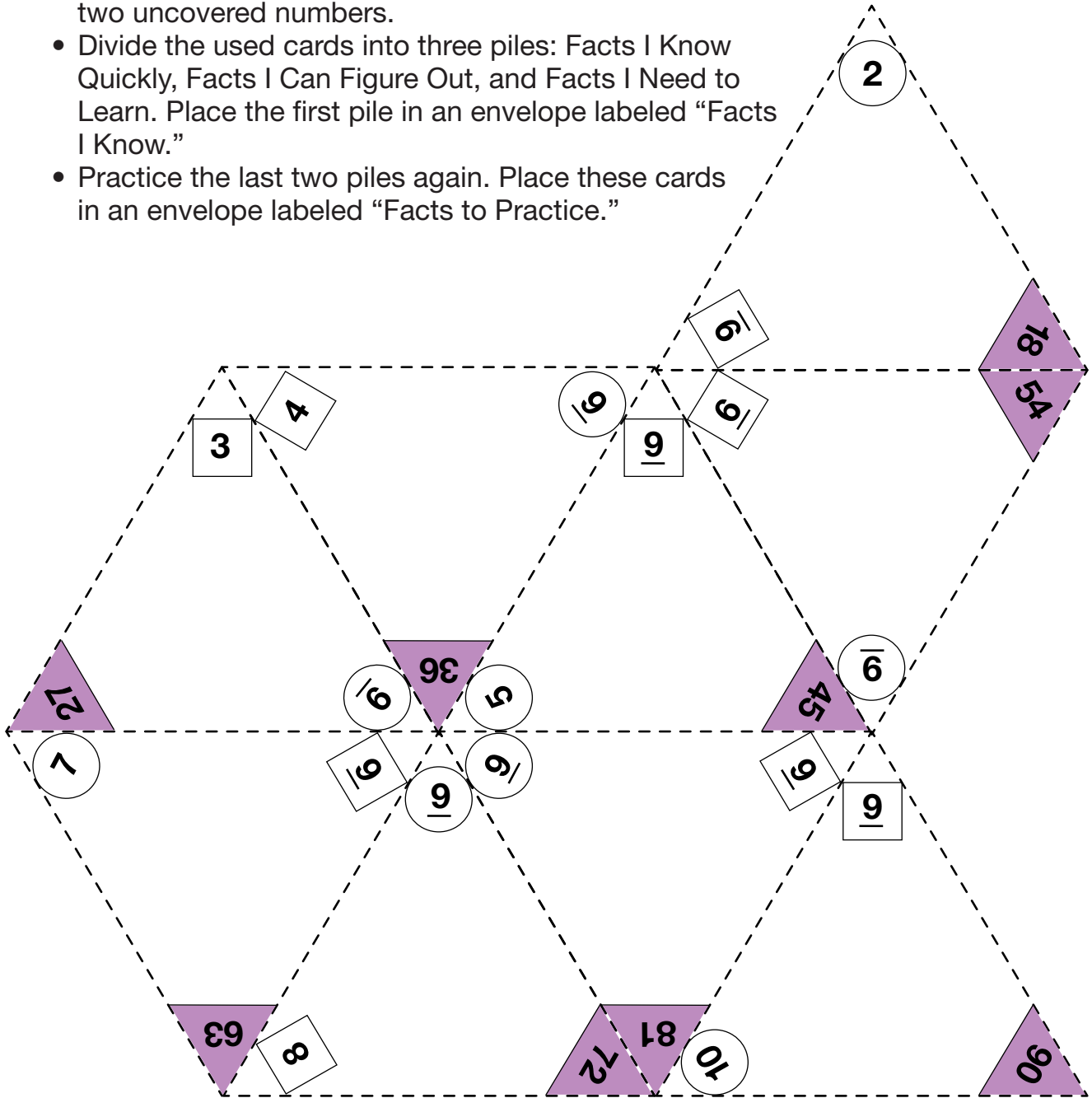
The area of the shaded part is 150 square centimeters. The length of the hole is twice as long as the width of the hole.



- A. Find the area of the large rectangle.
- B. Find the area of the hole.
- C. Find the length and width of the hole.
- D. Show or tell how you found the answer to Question C.

# Triangle Flash Cards: 9s

- Work with a partner. Each partner cuts out the flash cards.
- To quiz you on a multiplication fact, your partner covers the shaded number. Multiply the two uncovered numbers.
- To quiz you on a division fact, your partner covers the number in the square or the number in the circle. Solve a division fact with the two uncovered numbers.
- Divide the used cards into three piles: Facts I Know Quickly, Facts I Can Figure Out, and Facts I Need to Learn. Place the first pile in an envelope labeled "Facts I Know."
- Practice the last two piles again. Place these cards in an envelope labeled "Facts to Practice."



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# Multiplication Facts I Know

- Circle the facts you know well.
- Keep this table and use it to help you multiply.
- As you learn more facts, you may circle them too.

×	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

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# Division Facts I Know

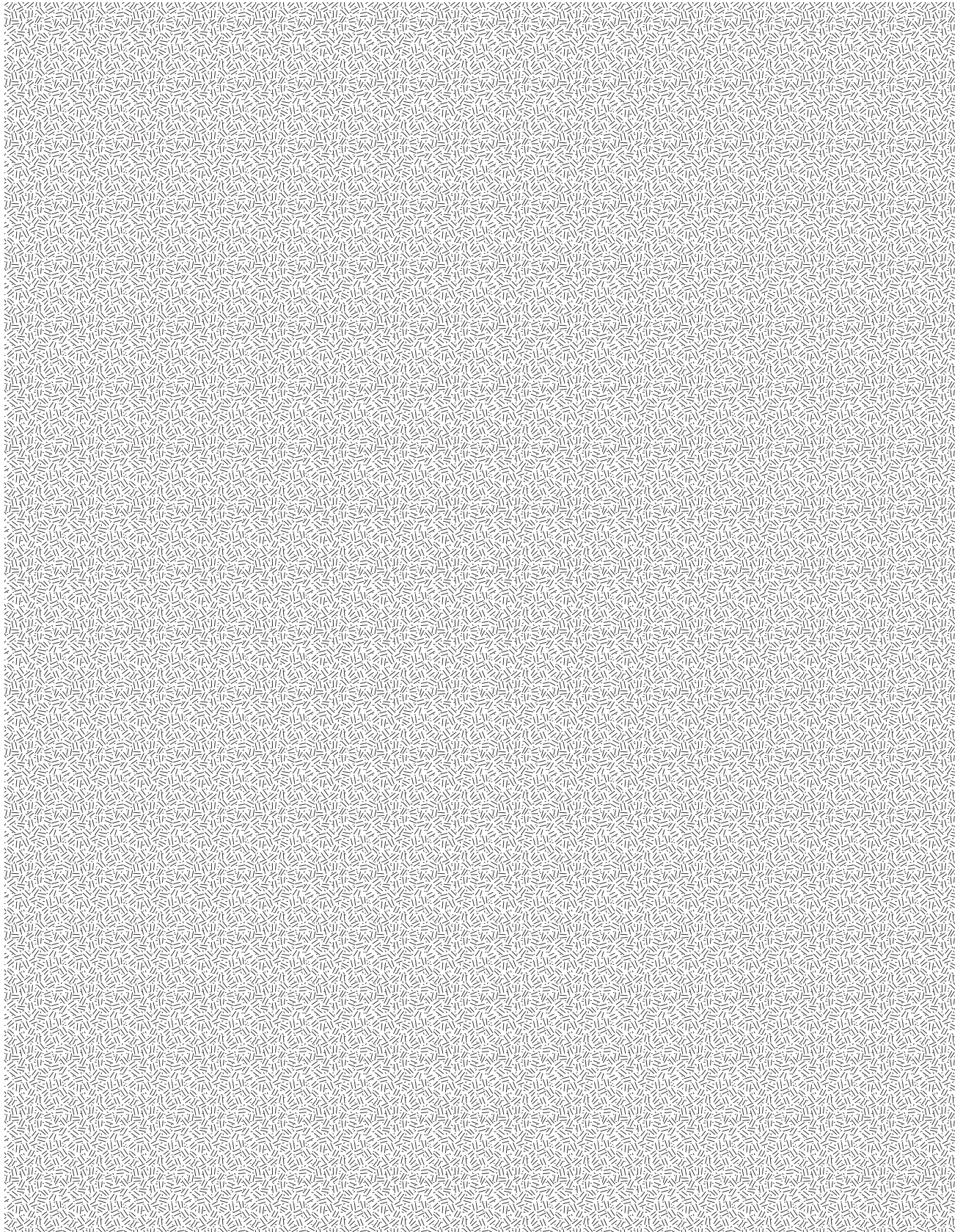
- Circle the facts you know well.
- Keep this table and use it to help you divide.
- As you learn more facts, you may circle them too.

×	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

Divisor

# Digit Cards 0-9

5	0
6	1
7	2
8	3
9	4



Name \_\_\_\_\_ Date \_\_\_\_\_

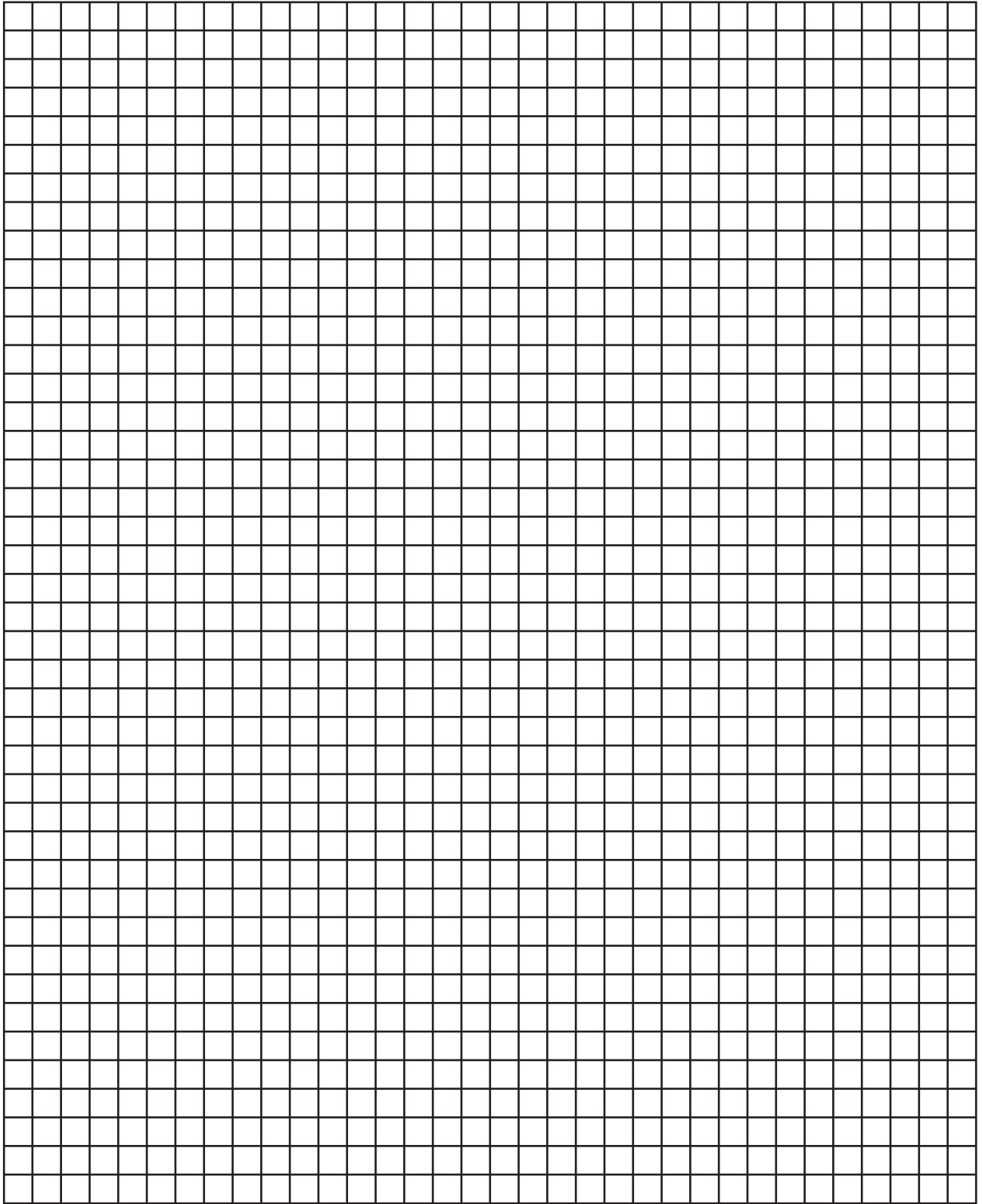
**Multiplication Strategies**  
**Check-In: Questions 17–19**  
**Feedback Box**

	Expectation	Check In	Comments
Multiply multidigit numbers using mental math and paper-and-pencil methods (expanded form, rectangle model, all-partials, compact). [Q# 17–19]	E4		
Choose appropriately from among mental math, estimation, and paper-and-pencil methods to find products. [Q# 17–19]	E6		

	Yes ...	Yes, but ...	No, but ...	No...
<b>MPE2. Find a strategy.</b> I choose good tools and an efficient strategy for solving the problem. [Q# 17–19]				
<b>MPE4. Check my calculation.</b> If I make mistakes, I correct them. [Q# 17–19]				

Name \_\_\_\_\_ Date \_\_\_\_\_

# Half-Centimeter Grid Paper



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Name \_\_\_\_\_ Date \_\_\_\_\_

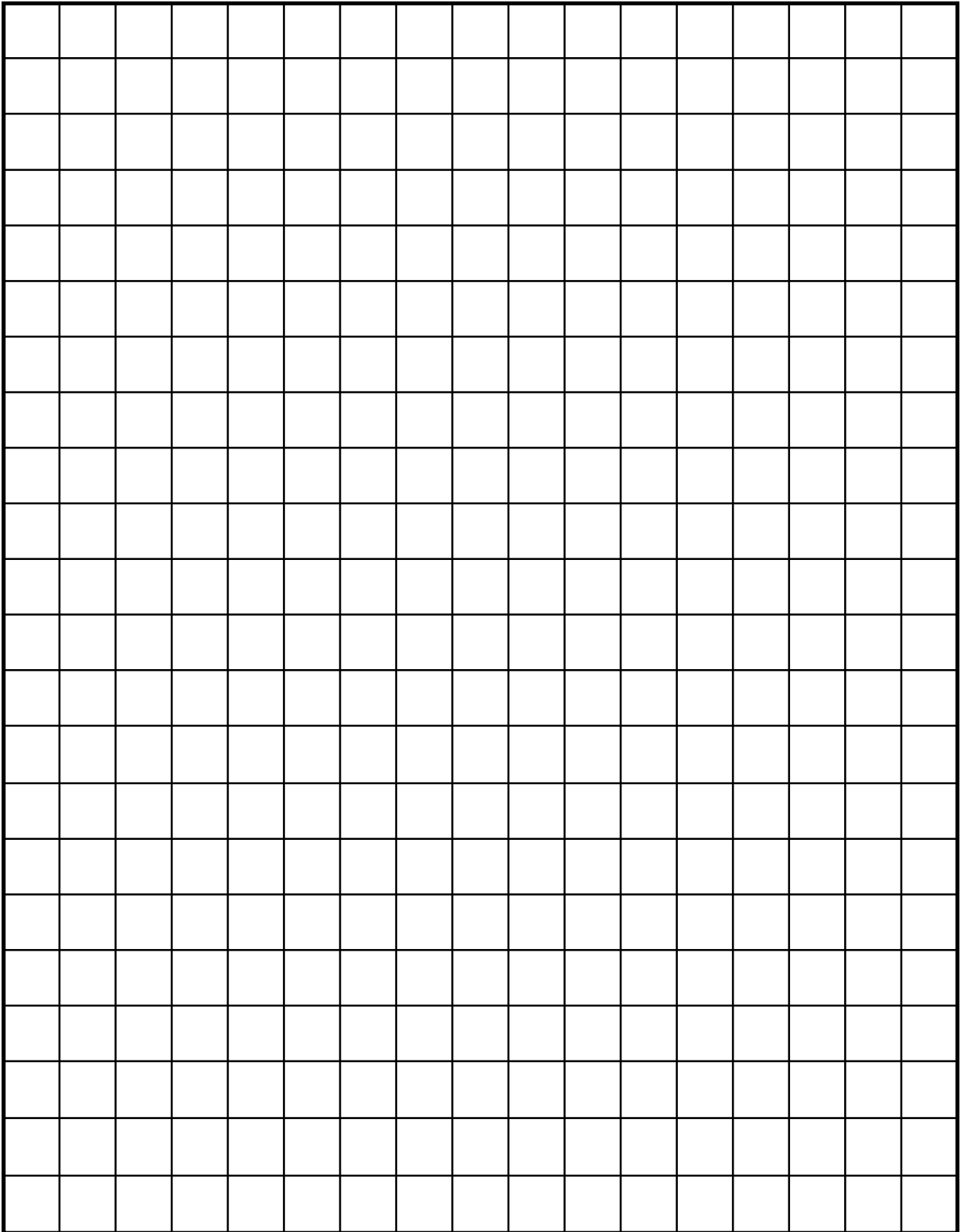
# Explore Multiplication by Multidigit Numbers

## Check-In: Questions 9–11

### Feedback Box

	Expectation	Check In	Comments
Multiply multidigit numbers using mental math and paper-and-pencil methods (expanded form, rectangle model, all-partials, compact). [Q# 9–11]	E4		
Choose appropriately from among mental math, estimation, and paper-and-pencil methods to find sums, differences, and products. [Q# 9–11]	E6		

	Yes . . .	Yes, but . . .	No, but . . .	No . . .
<b>MPE2. Find a strategy.</b> I choose good tools and an efficient strategy for solving the problem. [Q# 9–11]				
<b>MPE4. Check my calculation.</b> If I make mistakes, I correct them. [Q# 9–11]				



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# Super Challenge: Cut and Paste Puzzle

1. Challenge: Find the area of Shape A below and Shape B on the following page. Do not measure with a ruler.

A. Area of Shape A = \_\_\_\_\_

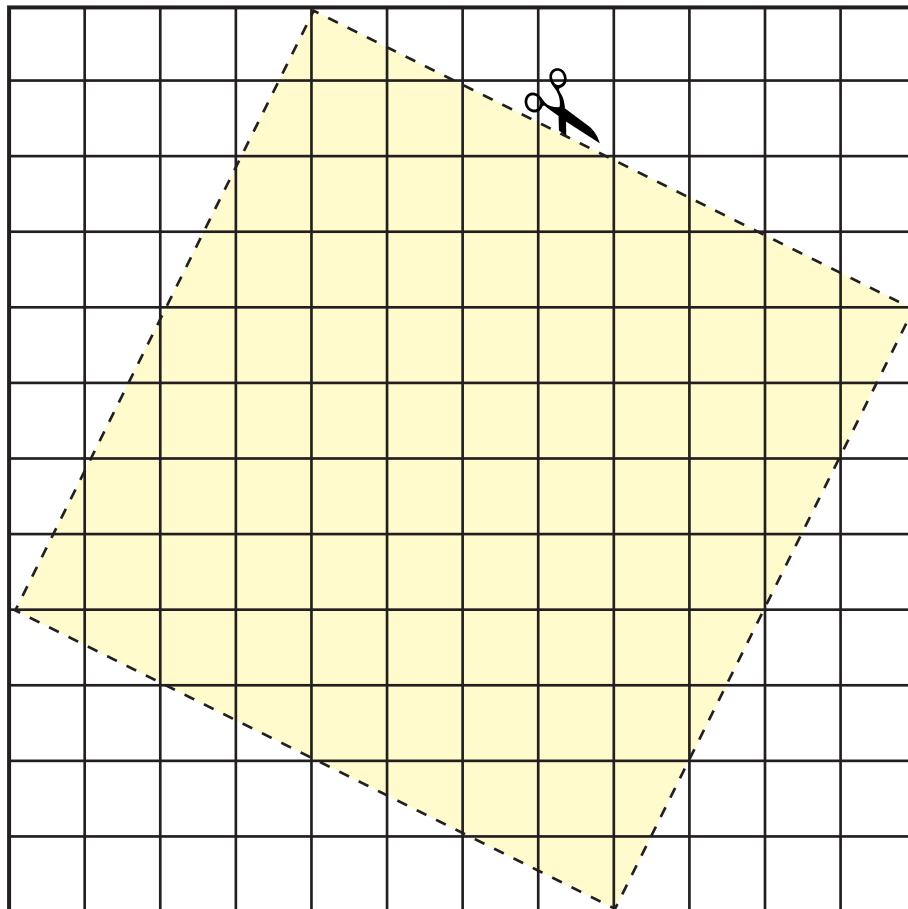
B. Area of Shape B = \_\_\_\_\_

2. Can you cut apart Shape A to cover Shape B exactly? \_\_\_\_\_

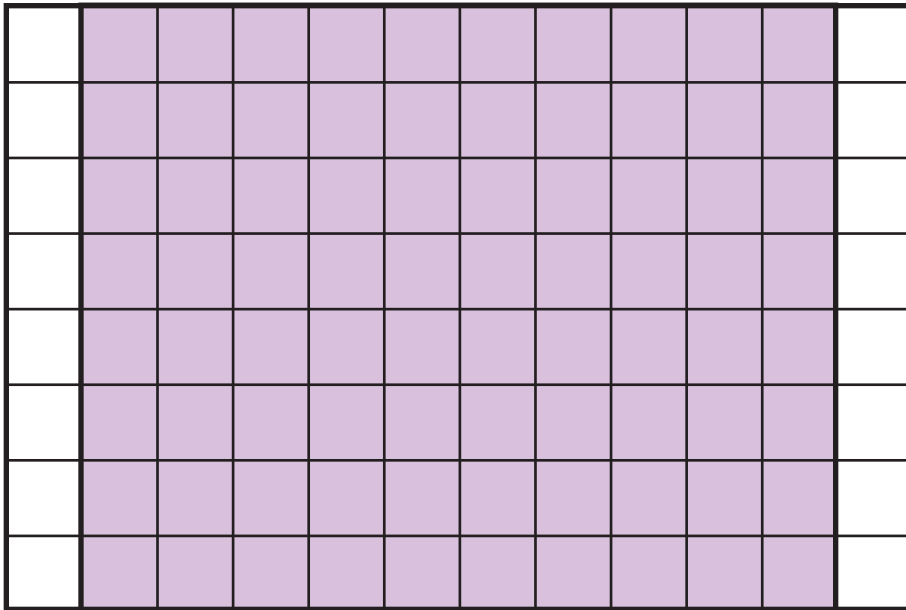
Explain. \_\_\_\_\_

If so, cut Shape A into as few pieces as possible and paste them to cover Shape B.

Shape A

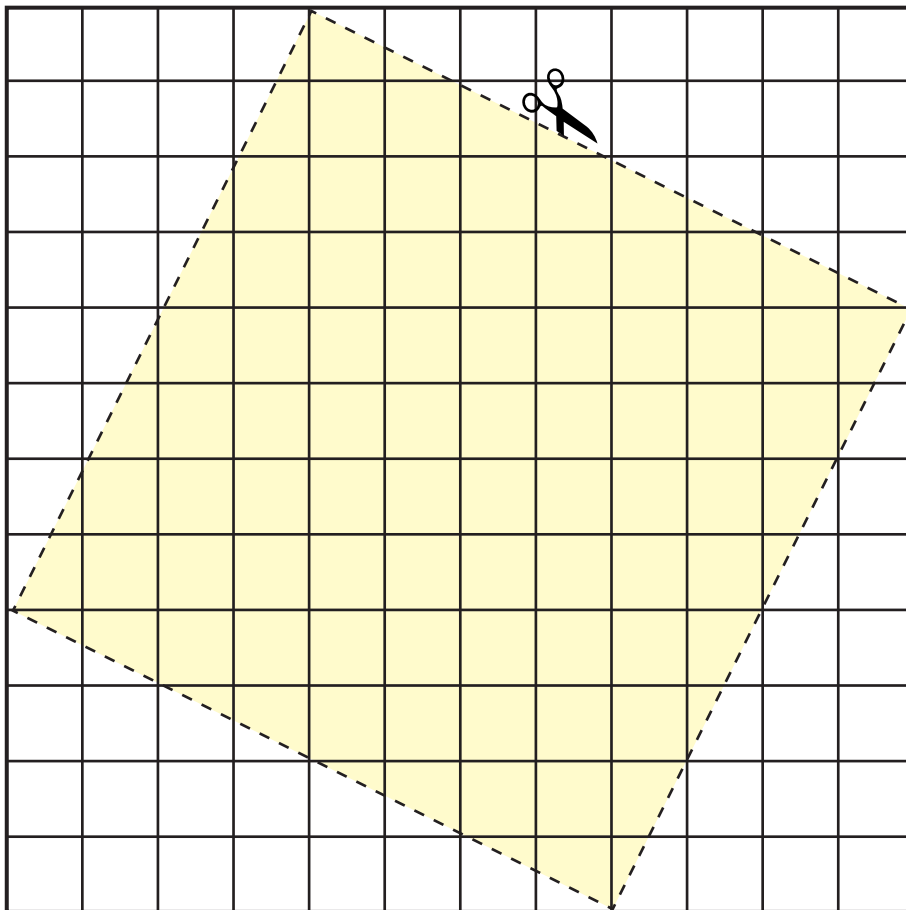


Shape B

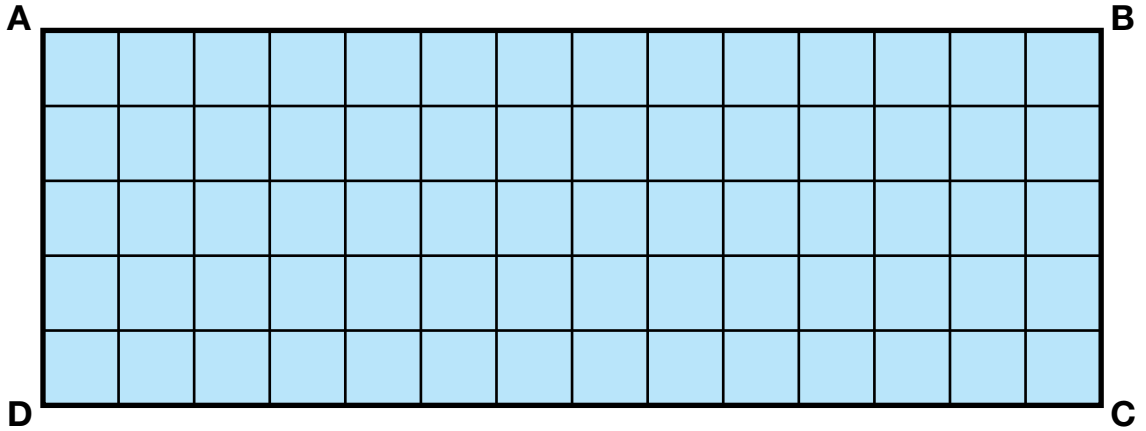


Shape A

A second copy of Shape A is here if you need to start over.

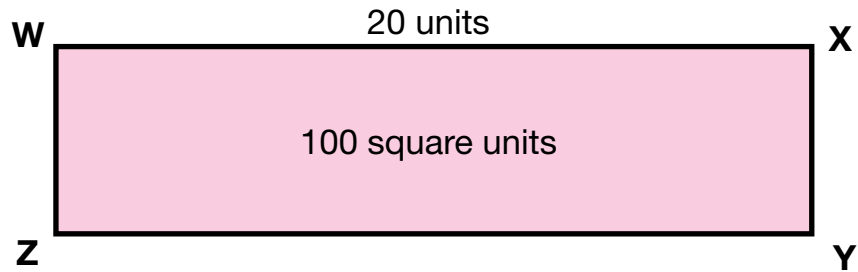


# Area of Rectangles



Area \_\_\_\_\_

Perimeter \_\_\_\_\_



Length \_\_\_\_\_

Name \_\_\_\_\_ Date \_\_\_\_\_

**Problem Solving with Area  
Check-In: Questions 16–17  
Feedback Box**

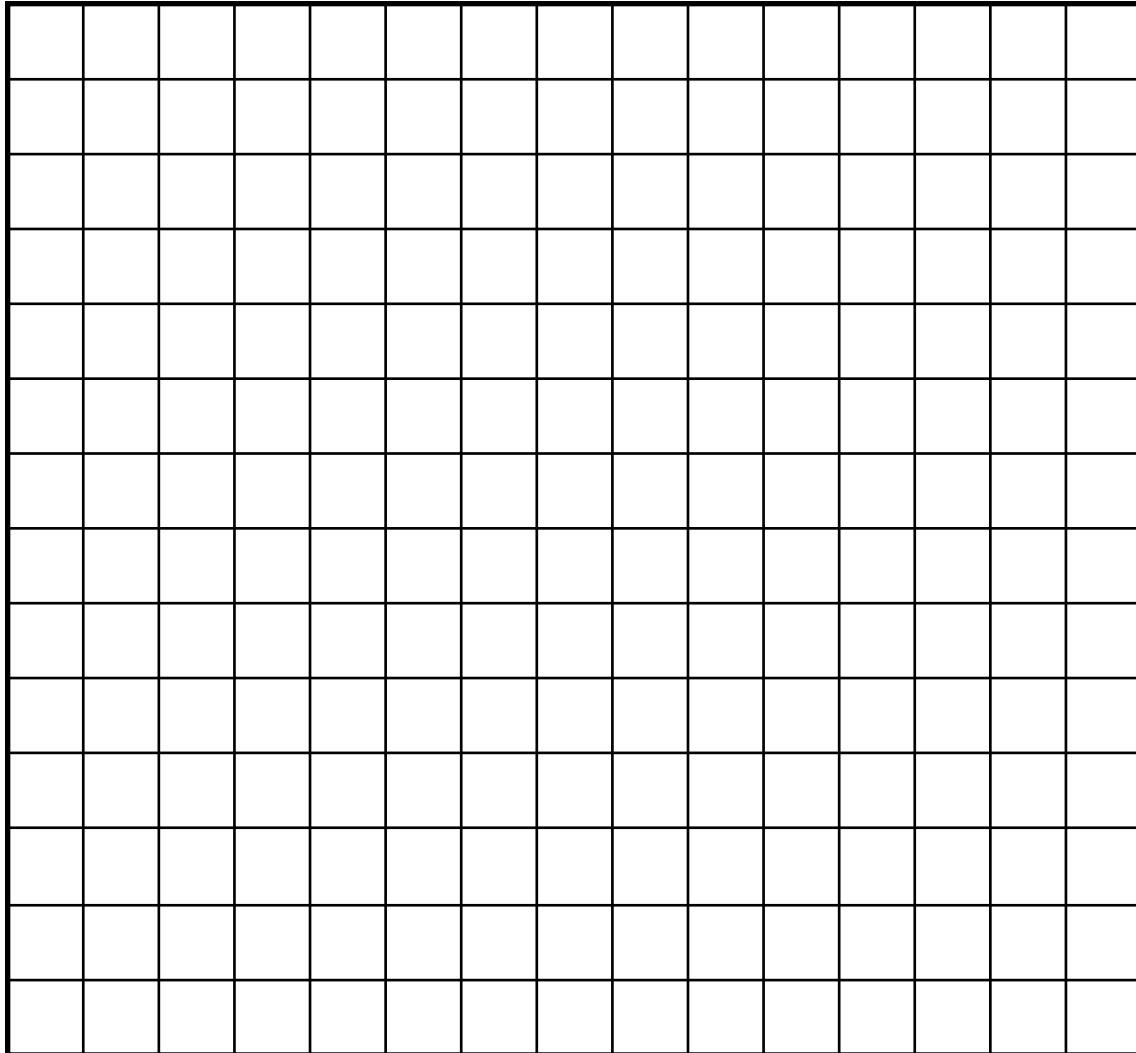
	Expectation	Check In	Comments
Solve multistep problems using addition, subtraction, multiplication, and division. [Q# 16–17]	E7		
Use multiplication and division strategies to find the area of rectangles or shapes based on rectangles. [Q# 16–17]	E8		

	Yes ...	Yes, but ...	No, but ...	No ...
<b>MPE1. Know the problem.</b> I read the problem carefully. I know the questions to answer and what information is important. [Q# 16–17]				
<b>MPE2. Find a strategy.</b> I choose good tools and an efficient strategy for solving the problem. [Q# 16]				
<b>MPE5. Show my work.</b> I show or tell how I arrived at my answer so someone else can understand my thinking. [Q# 16]				
<b>MPE6. Use labels.</b> I use labels to show what numbers mean. [Q# 16–17]				

# Make a Tank

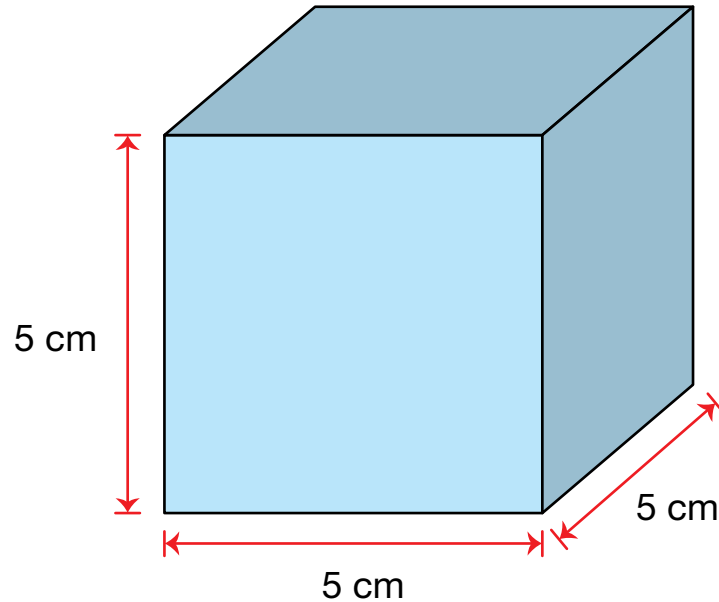
To make a tank:

- Draw congruent squares in each corner of the 15 cm by 15 cm grid.
- Cut out the grid.
- Cut off the congruent squares you drew in each corner.
- Fold to make a tank.

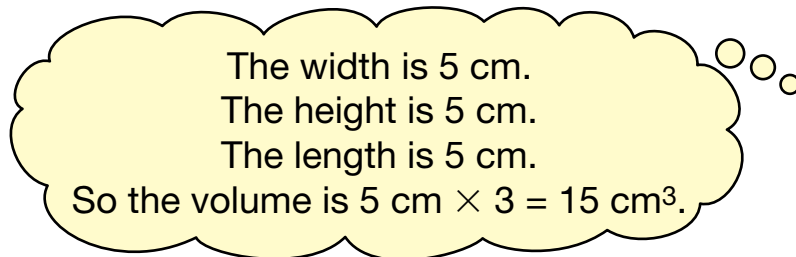


# Confused Contessa Finds Volume

Contessa is finding the volume of this cube.



Here is her thinking:

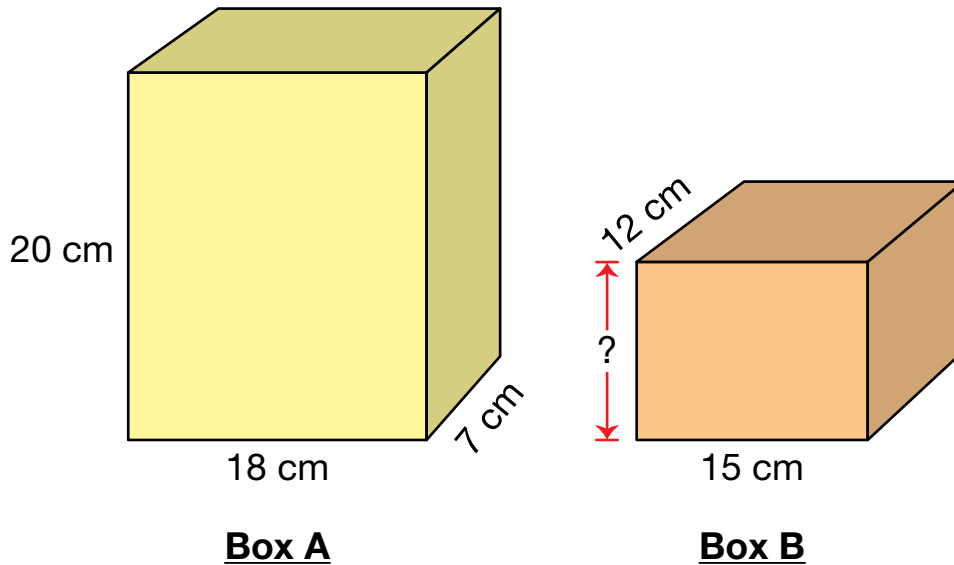


**Discuss Contessa's solution with a partner. Do you agree with Contessa? Why or why not?**



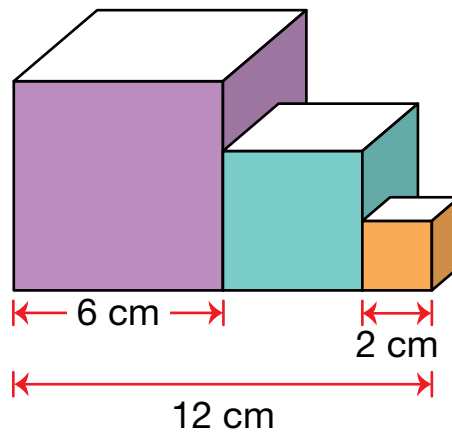
## Find the Volume

1. Both boxes have the same volume. Find the height of Box B. Show or tell how you solved the problem.



Height of Box B \_\_\_\_\_

2. The shape in the sketch is built from three cubes. Find the volume of the shape. Show or tell how you solved the problem.



Volume \_\_\_\_\_

Name \_\_\_\_\_ Date \_\_\_\_\_

<b>Find the Volume Feedback Box</b>	<b>Expectation</b>	<b>Check In</b>	<b>Comments</b>
Solve multistep problems using addition, subtraction, multiplication, and division.	E7		
Use multiplication and division strategies to find the volume of boxes.	E9		

	<b>Yes ...</b>	<b>Yes, but ...</b>	<b>No, but ...</b>	<b>No ...</b>
<b>MPE1. Know the problem.</b> I read the problem carefully. I know the questions to answer and what information is important.				
<b>MPE2. Find a strategy.</b> I choose good tools and an efficient strategy for solving the problem.				
<b>MPE5. Show my work.</b> I show or tell how I arrived at my answer so someone else can understand my thinking.				
<b>MPE6. Use labels.</b> I use labels to show what numbers mean.				

# Multiplication Digits Game

The object of the game is to get the largest (or smallest) correct answer to a multiplication problem. Any number of people can play.

## Materials

- one set of *Digit Cards 0–9*
- paper and pencils

## Directions

1. One person is the leader and the others are players. The leader chooses whether the largest or smallest answer will win and draws one game board so that all of the players can see it.

The image shows four multiplication problems represented by empty boxes. Each problem has a horizontal line under the bottom row. The first problem is a two-digit number multiplied by a one-digit number. The second is a two-digit number multiplied by a two-digit number. The third is a three-digit number multiplied by a one-digit number. The fourth is a two-digit number multiplied by a two-digit number.

2. Each player draws the game board on his or her paper.
3. The leader shuffles the cards, places them face down, picks the top card, and reads the digit to all the players.
4. Each player writes that digit in one of the boxes on his or her game board. Each player must decide where to place the digit in order to get the largest (or smallest) answer. Once a player has written down a digit, it may not be moved. No digit will be repeated.
5. The leader places the first card in a discard pile, then reads the next card. Players place this digit in another empty box. Play continues until all the boxes are filled.
6. When all the boxes are filled, players multiply to find their answers. Since the player with the largest (or smallest) correct answer wins the game, players should check their answers using a second strategy or estimate to see if their answers are reasonable.

Name \_\_\_\_\_ Date \_\_\_\_\_

# Workshop: Multiplication Strategies

## Check-In: Question 23

### Feedback Box

	Expectation	Check In	Comments
Choose appropriately from among mental math, estimation, and paper-and-pencil methods to find products.	E6		
Solve multistep problems.	E7		
Use multiplication strategies to find the area of rectangles.	E8		
Use multiplication strategies to find the volume of boxes.	E9		

	Yes ...	Yes, but ...	No, but ...	No ...
<b>MPE1. Know the problem.</b> I read the problem carefully. I know the questions to answer and what information is important.				
<b>MPE2. Find a strategy.</b> I choose good tools and an efficient strategy for solving the problem.				