Unit 4: Family Letter

Home Link 3-14

NAME DATE TIME

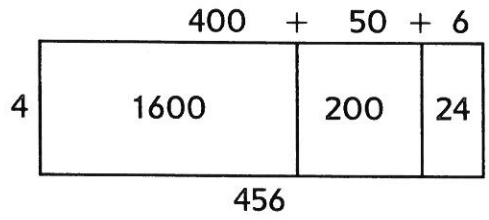
Multidigit Multiplication

In Unit 4 your child will multiply multidigit numbers using **extended multiplication facts, partial-products multiplication,** and **lattice multiplication**. Throughout the unit, students use these methods to solve real-life multistep multiplication number stories.

The unit begins with extended multiplication facts. Knowing that $5 * 3 = 15$ helps students see that $50 * 3 = 150$; $500 * 3 = 1{,}500$; and so on. Working with extended facts gives students the ability to multiply larger numbers with ease.

Students also learn the partial-products multiplication method in which the value of each digit in one factor is multiplied by the value of each digit in the other factor. They partition a rectangle into smaller parts to help them understand how the method works. The example below shows how to use partial-products multiplication to find $456 * 4$.

Partitioned Rectangles



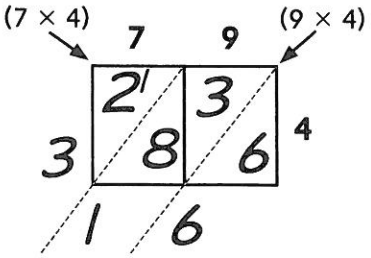
Partial-Products Multiplication

$$\begin{array}{rr} & 456 \\ & \times \quad 4 \\ \hline 4 * 400 \rightarrow & 1600 \\ 4 * 50 \rightarrow & 200 \\ 4 * 6 \rightarrow & + \quad 24 \\ \hline & 1,824 \end{array}$$

To practice multiplying 2-digit numbers using partial-products multiplication, students play a game called *Multiplication Wrestling.*

Finally, students are introduced to the lattice multiplication method: The lattice method breaks down the numbers into place values, allowing students to work with smaller numbers while solving a multidigit multiplication problem. It is an efficient method, often taking no more time than other methods.

$$\begin{array}{rl} & 79 \leftarrow \text{factor} \\ \times & \quad 4 \leftarrow \text{factor} \\ \hline & 316 \end{array}$$



In this unit, students apply their understanding of multidigit multiplication to solve conversion problems involving liters and milliliters and grams and kilograms. They also find the area of rectilinear figures.

Please keep this Family Letter for reference as your child works through Unit 4.

Vocabulary

Important terms in Unit 4:

adjacent Next to, or adjoining.

decompose To "break apart" numbers into friendlier numbers.

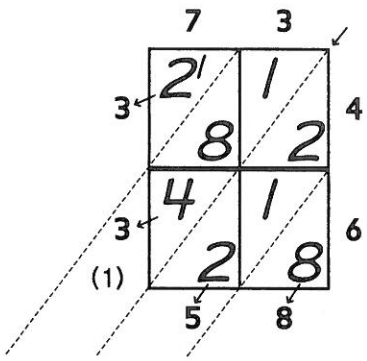
Distributive Property A rule saying that if a, b, and c are real numbers, then: $a * (b + c) = (a * b) + (a * c)$.

extended multiplication facts Multiplication facts involving multiples of 10, 100, and so on. For example, $400 * 6 = 2{,}400$ and $20 * 30 = 600$ are extended multiplication facts.

gram (g) A unit of mass in the metric system. There are about 454 grams in 1 pound.

kilogram (kg) 1,000 grams.

lattice multiplication A way to multiply multidigit numbers. *For example:*



liter (L) A unit of capacity in the metric system. It is equivalent to a little more than one quart.

mass The measure of the amount of matter in an object.

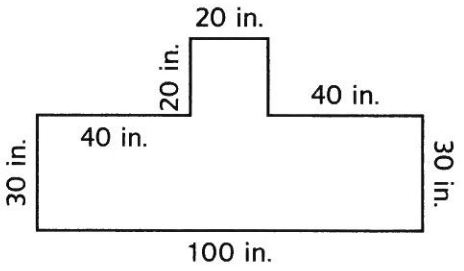
milliliter (mL) $\frac{1}{1000}$ of a liter.

partial-products multiplication A way to multiply in which the value of each digit in one factor is multiplied by the value of each digit in the other factor. The final product is the sum of the partial products. *For example:*

$$\begin{array}{rr} & 73 \\ * & 46 \\ \hline 40 * 70 \rightarrow & 2800 \\ 40 * 3 \rightarrow & 120 \\ 6 * 70 \rightarrow & 420 \\ 6 * 3 \rightarrow & +\ 18 \\ \hline & 3,358 \end{array}$$

partition (in partial-products multiplication) A technique that uses the Distributive Property to break up a large rectangle into smaller rectangles in order to find the area more easily in parts.

rectilinear figure A single figure formed by combining multiple adjacent rectangles.



Do-Anytime Activities

To work with your child on concepts taught in this unit, try these activities:

1. Practice extended multiplication facts such as $50 * 40 =$ ____.
2. Collect three to five cans and bottles from the kitchen. Put them on the table and ask your child to order them, without looking at the labels, based on the amount of liquid each container can hold and/or their mass. Ask your child to estimate both. Check the results together by looking at the labels.
3. Pose a multiplication problem and ask your child to solve it using a method of his or her choice. Have your child explain to you or someone else at home what he or she did to complete the problem.

Building Skills through Games

In this unit your child will play the following game to develop his or her understanding of multiplication. For detailed instructions, see the *Student Reference Book*.

Multiplication Wrestling See *Student Reference Book*, page 267.
The game provides practice with multiplication of 2-digit numbers by 2-digit numbers.

As You Help Your Child with Homework

As your child brings assignments home, you may want to go over instructions together, clarifying them as necessary. The answers listed below will guide you through the Home Links for this unit.

Home Link 4-1

1. 560; 3,200; 630; 3,600

3. 450; 200; 63,000; 28,000

5. 9; 240; 700; 6,300

7. Answers vary. **9.** 1,190

11. 13,303

Home Link 4-2

Number models are sample answers.

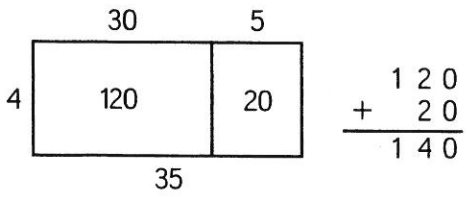
1. $(20 * 30) - (10 * 30) = 300$; 330; Answers vary.

3. $30 * 50 = 1{,}500$; $30 * 40 = 1{,}200$; $1{,}500 - 1{,}200 = 300$; 496; Answers vary.

5. 1,410,000

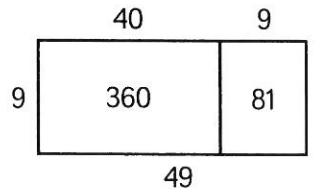
Home Link 4-3

1. 140; Sample answer:



$$\begin{array}{r} 120 \\ +\ 20 \\ \hline 140 \end{array}$$

3. 441; Sample answer:



$$\begin{array}{r} 360 \\ +\ 81 \\ \hline 441 \end{array}$$

5. 2,956 **7.** 2,559

Home Link 4-4

1. 8,000; 15,000; 20,000; 25,000

3. 122,000 mL **5.** 14,445 **7.** 62,341

Home Link 4-5

1. Sample answer: Four calculators fit in a layer. The box is 5 cm tall, so there are 5 layers of calculators. The box fits 4 calculators * 5, which is 20 calculators in all.

3. 108 **5.** 129

Home Link 4-6

1.
$$\begin{array}{r} 48 \\ *\ \ 3 \\ \hline 120 \\ +24 \\ \hline 144 \end{array}$$

3. 9 [100,000s] + 5 [1,000s] + 6 [100s] + 3 [1s]

5. 2 [1,000,000s] + 5 [100,000s] + 9 [10,000s] + 9 [1,000s] + 2 [1s]

Home Link 4-7

1. 25; 50,000; 75,000; 100

3. 237,000; 98,000; 485; 920,000

5. 63,000 grams **7.** 396 **9.** 294

Home Link 4-8

1. \$478 **3.** \$55

5. 1, 3, 7, 21 **7.** 1, 2, 3, 4, 6, 9, 12, 18, 36

Home Link 4-9

1. 1,748

$$\begin{array}{r} 46 \\ * \quad 38 \\ \hline 1200 \\ 180 \\ 320 \\ + \quad 48 \\ \hline 1,748 \end{array}$$

3. $65 * 22 = t$; 1,430 trees

5. 185 **7.** 1,992

Home Link 4-10

1. 42; 420; 420; 4,200; 4,200; 42,000

3. 32; 320; 320; 3,200; 3,200; 32,000

5. 6; 6; 60; 9; 900; 9,000

7. 2,139 **9.** 32,632

Home Link 4-11

1. $18 * 27 = 486$; 486 square units

3. Sample answer: $100 * 30 = 3{,}000$; $20 * 20 = 400$; $3{,}000 + 400 = 3{,}400$; 3,400 square inches

5. 1, 2, 31, 62 **7.** 1, 5, 11, 55

Home Link 4-12

Sample number models:

1. $(10 * 7) * 2 = 140$; $(5 * 7) * 2 = 70$; $140 + 70 = 210$ stickers;

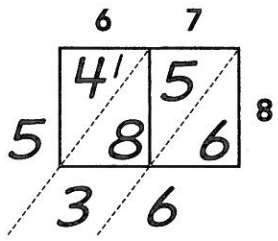
$(8 * 7) * 2 = x$; $(5 * 7) * 2 = y$; $112 + 70 = s$; 182 stickers

3. 1 and 50, 2 and 25, 5 and 10

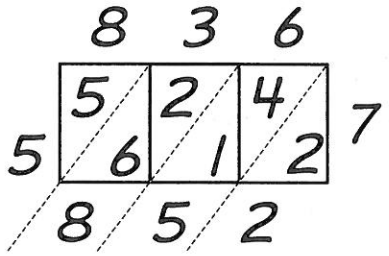
5. 1 and 85, 5 and 17

Home Link 4-13

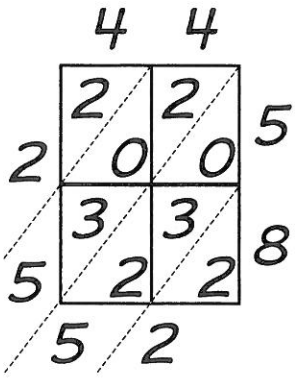
1. 536



2. 5,852



4. 2,552



6. 616 **8.** 356

Multiplication Puzzles

Home Link 4-1

NAME DATE TIME

Solve the multiplication puzzles mentally. Fill in the blank boxes.

SRB 102

Examples:

*	300	2,000
2	600	4,000
3	900	6,000

*	80	50
4	320	200
8	640	400

①

*	70	400
8		
9		

②

*	5	7
80		
600		

③

*	9	4
50		
7,000		

④

*		600
7	3,500	
		2,400

⑤

*		8
30	270	
		5,600

⑥

*	400	
	3,600	
20		10,000

Make up and solve some puzzles of your own.

⑦

*		

⑧

*		

Practice

Solve using U.S. traditional addition or subtraction.

⑨ 321 + 869 = _____

⑩ 5,401 − 752 = _____

⑪ 4,568 + 8,735 = _____

⑫ 9,156 − 4,584 = _____

Finding Estimates and Evaluating Answers

Home Link 4-2

NAME DATE TIME

Write an estimate and show your thinking. Solve using a calculator. Check to see that your answer is reasonable.

SRB 82-89

(1) Alice sleeps an average of 9 hours per night. A cat can sleep up to 20 hours per day. About how many more hours does a cat sleep in 1 month than Alice?

Estimate: _____

Answer: About _____ more hours per month

Is your answer reasonable? _____ How do you know? _____

_____

(2) Koalas sleep about 22 hours a day. Pandas sleep about 10 hours a day. About how many more hours does a typical koala sleep in 1 year than a typical panda?

Estimate: _____

Answer: About _____ more hours per year

Is your answer reasonable? _____ How do you know? _____

_____

(3) There are 30 Major League Baseball (MLB) teams and 32 National Football League (NFL) teams. The expanded roster for MLB teams is 40 players and it is 53 for NFL teams. How many more players are in the NFL than in the MLB?

Estimate: _____

Answer: _____ more players

Is your answer reasonable? _____ How do you know? _____

_____

Practice

Round to the nearest thousand.

(4) 45,493 _____

Round to the nearest ten-thousand.

(5) 1,409,836 _____

Partitioning Rectangles

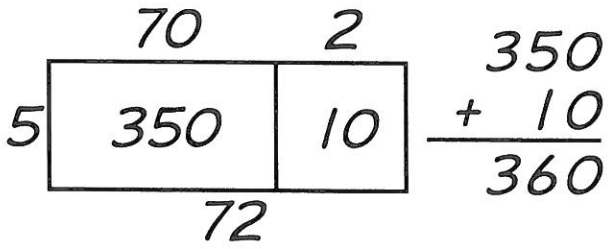
Home Link 4-3

NAME DATE TIME

Solve the multiplication problems by partitioning a rectangle. Then add each part of the rectangle to get the product.

SRB 103-104

Example: 5 * 72 = 360



350
+ 10
360

① 4 * 35 = _____

② 6 * 83 = _____

③ 9 * 49 = _____

Practice

Solve using U.S. traditional addition or subtraction.

④ 9,289 + 1,476 = _____

⑤ 6,503 − 3,547 = _____

⑥ 5,619 + 5,999 = _____

⑦ 5,005 − 2,446 = _____

Converting Liquid Measures

Home Link 4-4

NAME DATE TIME

SRB 193-194

Complete the table.

(1)

Liters (L)	Milliliters (mL)
8	
15	
20	
25	

(2) Mrs. Wong's students kept track of how much water they used to water the classroom plants. The first week they used 24 liters, and the second week they used 17 liters. How many more milliliters did they use the first week than the second?

Answer: _____ mL

(3) My fish tank holds 64 liters of water. My neighbor's tank holds 58 liters of water. How many milliliters is that combined?

Answer: _____ mL

(4) Mrs. Reyes filled her kiddie pool with 83 liters of water. Her children added 2,000 mL of water to the pool. How many liters of water are in the pool now?

Answer: _____ L

Practice

Solve using U.S. traditional addition or subtraction.

(5) 4,638 + 9,807 = _____

(6) 7,322 − 3,741 = _____

(7) 55,812 + 6,529 = _____

(8) 98,001 − 7,443 = _____

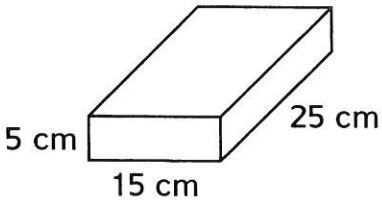
Using Multiplication

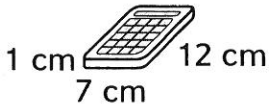
Home Link 4-5

NAME DATE TIME

SRB 103-105

Ms. Patel wants to keep her classroom calculators in a box that is 25 centimeters long, 15 centimeters wide, and 5 centimeters tall. The calculators measure 12 centimeters long, 7 centimeters wide, and 1 centimeter tall. How many calculators can Ms. Patel fit in the box?





(1) Solve this problem. Show or explain how you solved the problem.

(2) Show or explain how you know your answer makes sense.

Practice

Sketch a rectangle or use partial products to solve.

(3) $27 * 4 =$ _____

(4) $48 * 9 =$ _____

(5) $43 * 3 =$ _____

(6) $81 * 5 =$ _____

Multiplying in Parts

Home Link 4-6

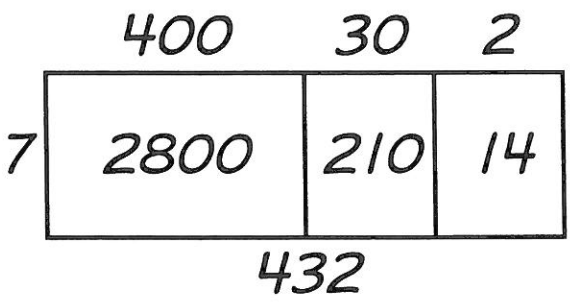
NAME DATE TIME

In the example, a rectangle was drawn to represent the problem. Then partial-products multiplication was used to record the work in a simpler way. Use partial-products multiplication to solve Problems 1 and 2.

SRB 103-104, 106

Example:

Partitioned Rectangle



Partial-Products Multiplication

$$\begin{array}{r} 432 \\ * \quad 7 \\ \hline 2800 \\ 210 \\ + \quad 14 \\ \hline 3{,}024 \end{array}$$

① $\begin{array}{r} 48 \\ * \quad 3 \\ \hline \end{array}$

② $\begin{array}{r} 653 \\ * \quad 8 \\ \hline \end{array}$

Practice

Write the numbers in expanded form.

③ 905,603 _____

④ 589,043 _____

⑤ 2,599,002 _____

⑥ 8,003,952 _____

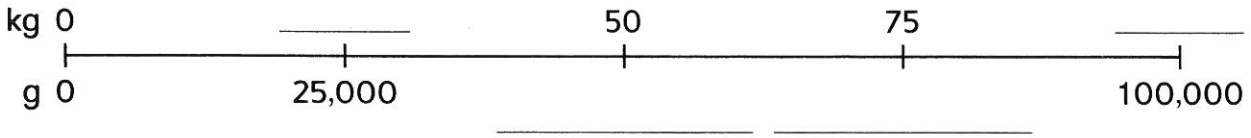
Using a Measurement Scale

Home Link 4-7

NAME DATE TIME

(1) Fill in the blanks on the measurement scale.

SRB 188-189



Complete the two-column tables.

(2)

Kilograms (kg)	Grams (g)
6	
14	
	27,000
101	

(3)

Kilograms (kg)	Grams (g)
237	
98	
	485,000
920	

(4) Find three items in your home that have the mass listed in grams or kilograms. Be sure to tell whether the mass is kilograms or grams.

Item	Mass in Kilograms (kg) or Grams (g)

(5) Among other foods, a giraffe in a zoo eats 4 kg of plant pellets and 5 kg of hay each day. How many grams of these foods does a giraffe eat in one week?

Answer: _____ grams

Practice

(6) 52 * 7 = _____

(7) 99 * 4 = _____

(8) 61 * 8 = _____

(9) 49 * 6 = _____

Money Number Stories

Home Link 4-8

NAME DATE TIME

Family Note Today your child solved multistep number stories involving multiplication, addition, and subtraction of money amounts. Have your child explain a plan for solving each of the following problems and then solve it.

Mr. Russo is buying equipment for his baseball team. Use the table to the right to answer questions about his purchases.

SRB 26

Item	Price
Wooden bat	$49
Metal bat	$74
Glove	$35
Helmet	$22

(1) Mr. Russo needs 9 helmets and 8 gloves. How much will they cost in all?

Answer: $_____

(2) Mr. Russo wants to buy 6 bats for his team. How much more would it cost for him to buy 6 metal bats than 6 wooden bats?

Answer: $_____

(3) Mr. Russo buys 5 wooden bats and gives the cashier $300. How much change does he get?

Answer: $_____

(4) If the cashier only has $10 and $1 bills, what are two ways he could make Mr. Russo's change?

Answer: _____

_____

Practice

List the factors for the following numbers:

(5) 21 _____ _____ _____ _____

(6) 40 _____ _____ _____ _____ _____ _____ _____ _____

(7) 36 _____ _____ _____ _____ _____ _____ _____ _____ _____

(8) 45 _____ _____ _____ _____ _____ _____

Practicing Partial-Products Multiplication

Home Link 4-9

NAME DATE TIME

SRB 106-107

Solve using partial-products multiplication.

① 46 * 38 = _____

②
$$\begin{array}{r} 65 \\ *\ 32 \\ \hline \end{array}$$

③ Donnie and Raj went apple picking at an orchard that had 65 rows of trees. Each row had 22 trees in it. How many trees were in the orchard?

Number model with unknown: _____

Answer: _____ trees

④ A new apartment building has 33 floors, with 24 apartments on each floor. How many apartments are in the building?

Number model with unknown: _____

Answer: _____ apartments

Practice

⑤ 37 * 5 = _____

⑥ 27 * 6 = _____

⑦ 332 * 6 = _____

⑧ 2,958 * 7 = _____

Extended Multiplication Facts

Home Link 4-10

NAME DATE TIME

SRB 56-57, 102

Solve mentally.

① $6 * 7 =$ _____

$6 * 70 =$ _____

$60 * 7 =$ _____

$60 * 70 =$ _____

$600 * 7 =$ _____

$60 * 700 =$ _____

② $5 * 6 =$ _____

$5 * 60 =$ _____

$50 * 6 =$ _____

$50 * 60 =$ _____

$500 * 6 =$ _____

$50 * 600 =$ _____

③ $4 * 8 =$ _____

$4 * 80 =$ _____

$40 * 8 =$ _____

$40 * 80 =$ _____

$400 * 8 =$ _____

$40 * 800 =$ _____

④ $5 *$ _____ $= 15$

$30 *$ _____ $= 150$

$30 *$ _____ $= 1{,}500$

_____ $* 50 = 150$

_____ $* 500 = 1{,}500$

$30 *$ _____ $= 15{,}000$

⑤ 54 is _____ times as many as 9.

540 is _____ times as many as 90.

5,400 is _____ times as many as 90.

540 is 60 times as many as _____.

5,400 is 6 times as many as _____.

54,000 is 6 times as many as _____.

Practice

Solve using U.S. traditional addition or subtraction.

⑥ $6{,}419 + 7{,}809 =$ _____

⑦ $8{,}045 - 5{,}906 =$ _____

⑧ $76{,}543 + 84{,}086 =$ _____

⑨ $65{,}409 - 32{,}777 =$ _____

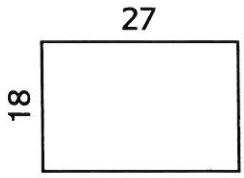
Finding the Area

Home Link 4-11

NAME DATE TIME

SRB 104-107, 204-206

(1) Find the area.



Equation: _____

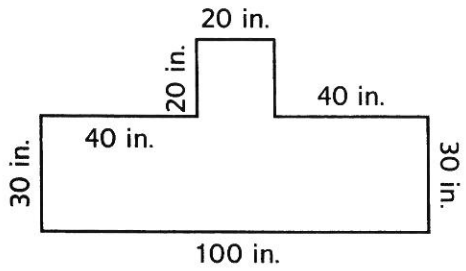
Answer: _____ square units

(2) A tool bench is 35 inches long and 19 inches wide.
How many square inches of the basement floor does it cover?

Equation: _____

Answer: _____ square inches

(3) Find the area.



Equations: _____

_____

Answer: _____ square inches

Practice

List all of the factors for the numbers below.

(4) 48 _____

(5) 62 _____

(6) 63 _____

(7) 55 _____

Multistep Multiplication Number Stories

Home Link 4-12

NAME DATE TIME

Write estimates and number models for each problem. Then solve.

SRB 26, 36-37

(1) Rosalie is collecting stickers for a scrapbook. She collected 8 stickers per day for 2 weeks and then collected 5 stickers per day for 2 weeks. How many stickers has Rosalie collected?

Estimate: _____

Number models with unknowns:

_____

_____

Answer: _____ stickers

(2) Rashaad's sister gives him 2 packs of baseball cards per month. Each pack has 11 cards. She gives him 3 extra packs for his birthday. How many cards does Rashaad get in a year?

Estimate: _____

Number models with unknowns:

_____

_____

Answer: _____ cards

Does your answer make sense? Explain. _____

_____

_____

Practice

Name all the factor pairs.

(3) 50 _____

(4) 72 _____

(5) 85 _____

(6) 90 _____

Lattice Multiplication

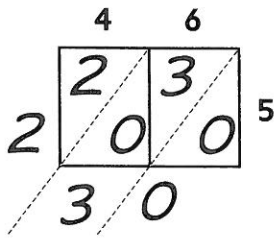
Home Link 4-13

NAME DATE TIME

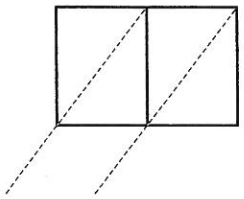
Use the lattice method to find the products.

SRB 108

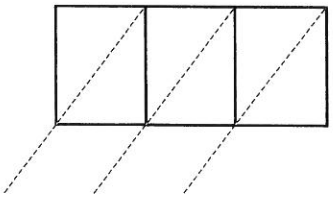
Example $5 * 46 = \underline{230}$



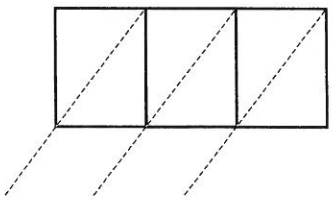
① $8 * 67 =$ _____



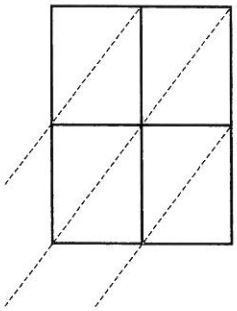
② $7 * 836 =$ _____



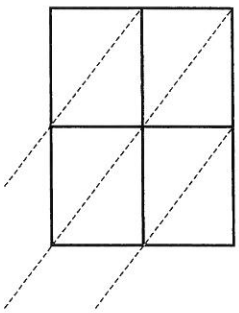
③ $6 * 531 =$ _____



④ $44 * 58 =$ _____



⑤ $84 * 78 =$ _____



Practice

⑥ $77 * 8 =$ _____

⑦ $49 * 2 =$ _____

⑧ $89 * 4 =$ _____

⑨ $183 * 5 =$ _____