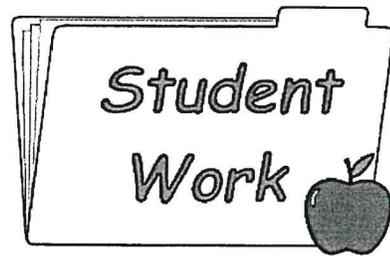


Unity Elementary School



MATH

2/4

Con't



7. Which is the missing number?

$$(37 + \square) + 25 = 37 + (45 + 25)$$

- A. 25
- B. 37
- C. 45
- D. 107

8. Jack said that a good estimate for $691 - 476$ is 200. Julio said it is 210. Who is correct?

- A. Jack is correct.
- B. Julio is correct.
- C. Neither is correct.
- D. Both are correct.

9. What is the missing number in this pattern?

32 28 24 ? 16 12

10. Thomson Elementary School has 490 students. Redding Elementary School has 385 students.

A. How many students do the schools have in all?

B. Weston Elementary School has 100 more students than Thomson Elementary School. How many students does Weston Elementary School have?



Domain 2

Operations and Algebraic Thinking

- | | |
|--|---|
| Lesson 9 Understand Multiplication
MGSE3.OA.1, MGSE3.OA.3,
MGSE3.OA.4 | Lesson 14 Multiply by Multiples of 10
MGSE3.NBT.3 |
| Lesson 10 Multiplication Facts
MGSE3.OA.3, MGSE3.OA.4,
MGSE3.OA.7 | Lesson 15 Multiply Three Numbers
MGSE3.OA.5 |
| Lesson 11 Multiplication Patterns
MGSE3.OA.9 | Lesson 16 Understand Division
MGSE3.OA.2, MGSE3.OA.3,
MGSE3.OA.4, MGSE3.OA.7 |
| Lesson 12 Multiplication Word Problems
MGSE3.OA.3, MGSE3.OA.8 | Lesson 17 Division Facts
MGSE3.OA.3, MGSE3.OA.4,
MGSE3.OA.6, MGSE3.OA.7 |
| Lesson 13 Multiplication Properties
MGSE3.OA.5 | Lesson 18 Division Word Problems
MGSE3.OA.3, MGSE3.OA.8 |

Domain 2: Cumulative Assessment for Lessons 9–18

Understand Multiplication



Getting the Idea

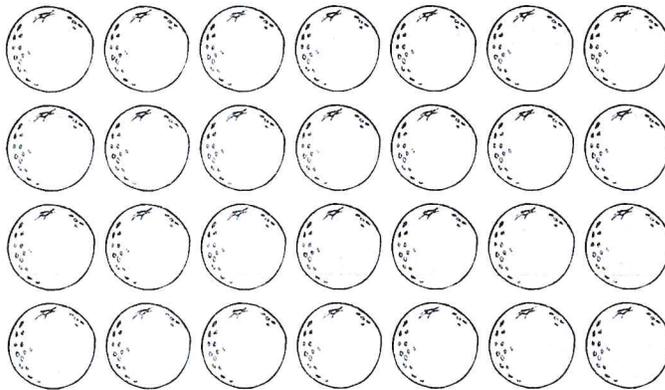
You can use **multiplication** to combine equal groups. An **array** shows equal groups of objects in rows and columns.

Here are the parts of a multiplication sentence.

$$\begin{array}{ccccccc}
 3 & \times & 2 & = & 6 \\
 \text{factor} & & \text{factor} & & \text{product}
 \end{array}$$

Example 1

Write a multiplication sentence for this array.



Strategy Count the number of rows and the number in each row.

Step 1 Count the number of rows. Count the number of oranges in each row.

There are 4 rows.

Each row has 7 oranges.

Step 2 Find the total number of oranges.

4 groups of 7 equals 28.

Step 3 Write the multiplication sentence.

$$4 \times 7 = 28$$

Solution The array shows the multiplication sentence $4 \times 7 = 28$.

Repeated addition is adding the same number many times.

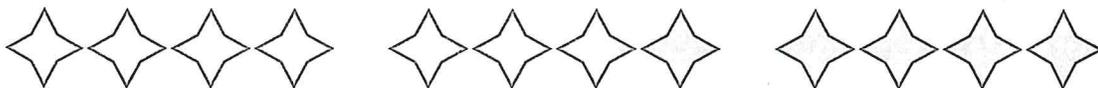
Repeated addition and multiplication have the same result.

You can use repeated addition to solve a multiplication problem.

Example 2

How many stars are there in all?

$$3 \times 4 = \square$$



Strategy Use repeated addition.

Step 1

Count the number of stars in each group. Count the number of equal groups.

There are 4 stars in each group.

There are 3 equal groups.

Step 2

Use repeated addition.

Add 4 three times to find the total.

$$4 + 4 + 4 = 12$$

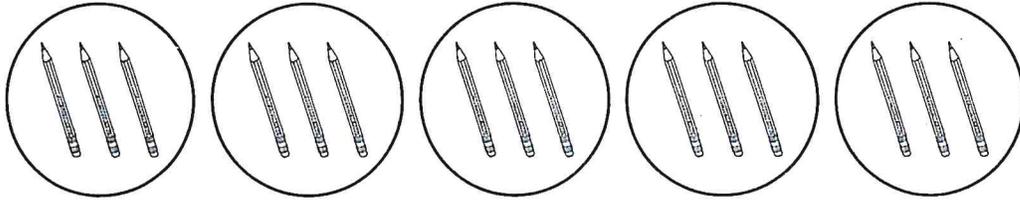
Solution There are 12 stars in all.

$$3 \times 4 = 12$$

Example 3

How many pencils are there in all?

Write an addition sentence and a multiplication sentence.



Strategy Use repeated addition.

Step 1

Count the number of pencils in each group. Count the number of equal groups.

There are 3 pencils in each group.

There are 5 equal groups.

Step 2

Write an addition sentence.

Add 3 five times to find the total.

$$3 + 3 + 3 + 3 + 3 = 15$$

Step 3

Write a multiplication sentence.

5 groups of 3 equals 15.

$$5 \times 3 = 15$$

Solution There are 15 pencils in all.

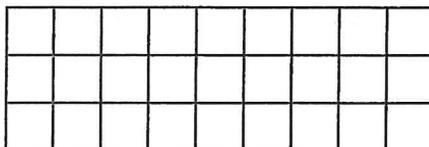
$$3 + 3 + 3 + 3 + 3 = 15$$

$$5 \times 3 = 15$$

You can use a rectangular area model to show multiplication.

Example 4

What multiplication sentence does this rectangular area model show?



Strategy Use an area model to multiply.

Step 1

Count the number of rows and columns.

There are 3 rows and 9 columns.

There are 27 squares in all.

Step 2

Write a multiplication sentence.

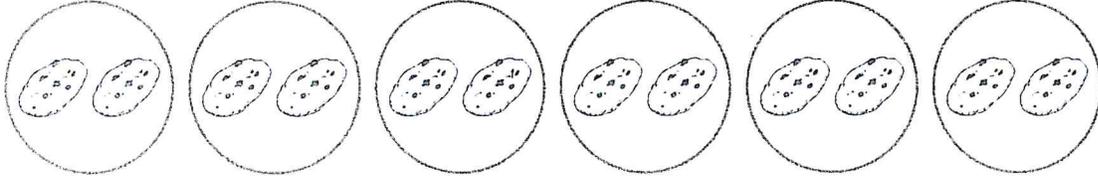
$$3 \times 9 = 27 \text{ or } 9 \times 3 = 27$$

Solution The rectangular area model shows $3 \times 9 = 27$ and $9 \times 3 = 27$.



Coached Example

Reiko put 2 cookies on each plate.



How many cookies are there in all?

Count the number of cookies on each plate.

There are _____ cookies on each plate.

Count the number of plates.

There are _____ plates.

Write an addition sentence.

_____ + _____ + _____ + _____ + _____ + _____ = _____

Write a multiplication sentence.

_____ groups of _____ equals _____.

_____ × _____ = _____

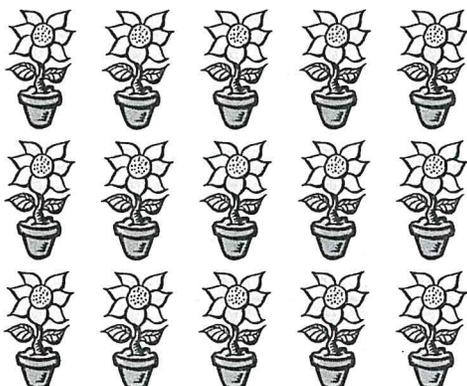
There are _____ cookies in all.



Lesson Practice • Part 1

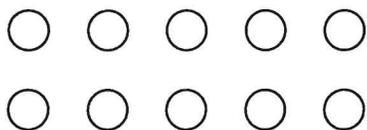
Choose the correct answer.

1. Which multiplication sentence does this array show?



- A. $3 \times 2 = 6$
 B. $5 \times 2 = 10$
 C. $3 \times 5 = 15$
 D. $5 \times 5 = 25$

2. Which multiplication sentence does this array show?



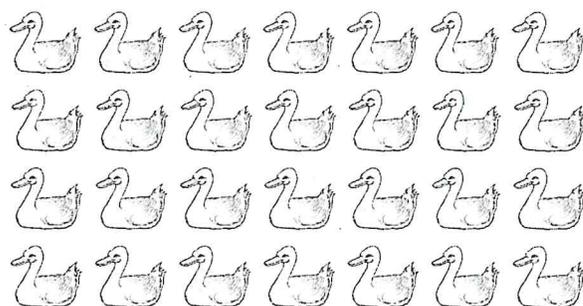
- A. $5 \times 5 = 25$
 B. $2 \times 6 = 12$
 C. $2 \times 5 = 10$
 D. $2 + 5 = 7$

3. Which multiplication sentence shows the total number of children?



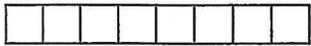
- A. $4 \times 6 = 24$
 B. $3 \times 7 = 21$
 C. $3 \times 4 = 12$
 D. $7 \times 1 = 7$

4. Which addition sentence does this picture show?



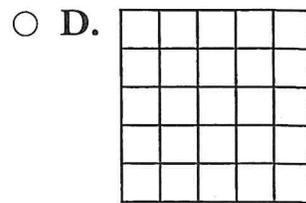
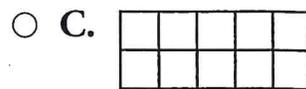
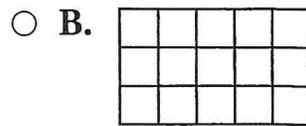
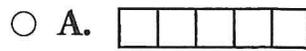
- A. $7 + 7 + 7 + 7 = 28$
 B. $4 + 4 + 4 + 4 = 16$
 C. $4 + 7 + 4 + 7 = 24$
 D. $4 + 4 + 4 = 12$

5. Which multiplication sentence does this area model show?



- A. $2 \times 4 = 8$
- B. $1 \times 8 = 8$
- C. $8 \times 8 = 64$
- D. $7 \times 2 = 14$
6. Which is equal to 6×4 ?
- A. $4 + 4 + 4 + 4$
- B. $6 + 6 + 6 + 6$
- C. $6 + 6 + 6 + 6 + 6 + 6$
- D. $6 + 4 + 6 + 4$

7. Which area model shows $5 \times 5 = 25$?



8. Look at the equal groups below.



- A. Write an addition sentence to show how many stars in all.

- B. Write a multiplication sentence to show how many stars in all.



Lesson Practice Part 2

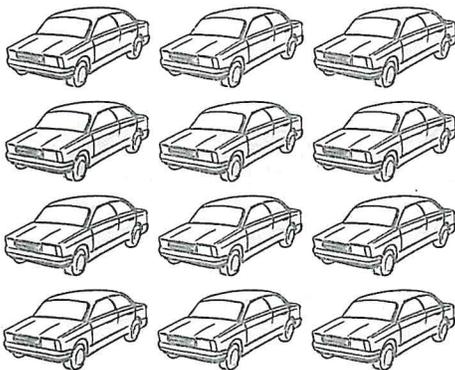
Choose the correct answer.

1. Which multiplication sentence does this array show?



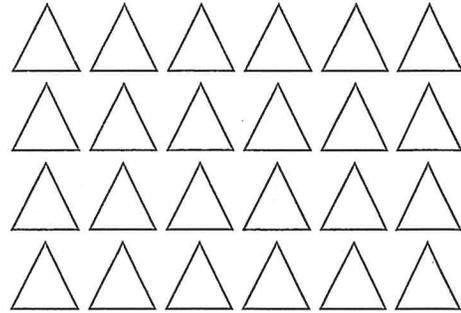
- A. $3 \times 4 = 12$
 B. $3 \times 5 = 15$
 C. $4 \times 4 = 16$
 D. $4 \times 5 = 20$

2. Which multiplication sentence does this picture show?



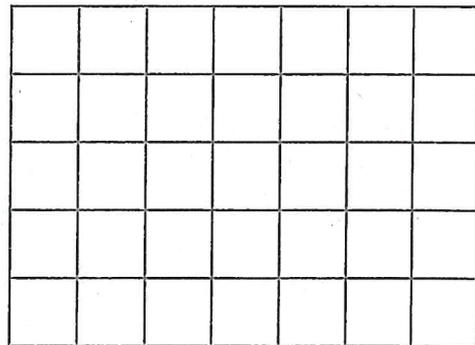
- A. $3 \times 3 = 9$
 B. $3 \times 4 = 12$
 C. $4 \times 4 = 16$
 D. $4 \times 5 = 20$

3. Which addition sentence is represented by the array?



- A. $4 + 4 + 4 + 4 = 16$
 B. $4 + 6 + 4 + 6 = 20$
 C. $6 + 6 + 6 + 6 = 24$
 D. $6 + 6 + 6 + 6 + 6 + 6 = 36$

4. Which multiplication sentence does this area model show?

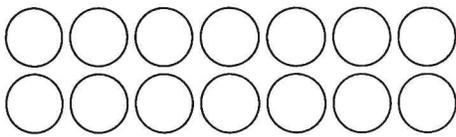


- A. $5 \times 7 = 35$
 B. $6 \times 6 = 36$
 C. $4 \times 4 = 16$
 D. $4 \times 5 = 20$

5. Which is equal to 8×3 ?

- A. $3 + 3 + 3 + 3 + 3 + 3 + 3 + 3$
- B. $8 + 3 + 8$
- C. $8 + 8 + 8$
- D. $8 + 8 + 8 + 8$

6. An array is shown.



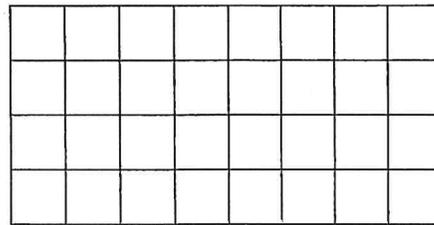
Which number represents the product?

- A. 14
- B. 9
- C. 7
- D. 2

7. What does 3×9 mean?

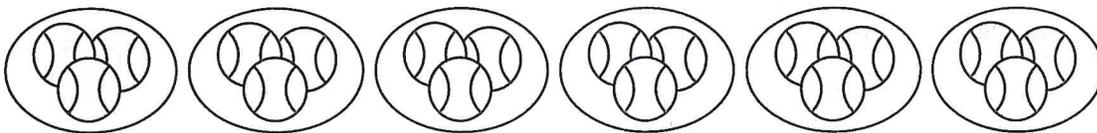
- A. $3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 + 3$
- B. $3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 + 3$
- C. $9 + 9 + 9 + 9$
- D. $9 + 9 + 9$

8. Which multiplication sentence does this area model show?



- A. $3 \times 8 = 24$
- B. $3 \times 9 = 27$
- C. $4 \times 8 = 32$
- D. $4 \times 9 = 36$

9. Look at the equal groups.



A. Write an addition sentence to show how many tennis balls in all.

B. Write two multiplication sentences to show how many tennis balls in all.

Multiplication Facts



Getting the Idea

There are many strategies you can use to solve multiplication problems.

For example, to find the product of $6 \times 6 = \square$:

You can use skip counting.

$$6, 12, 18, 24, 30, 36$$

You can use repeated addition.

$$6 + 6 + 6 + 6 + 6 + 6 = 36$$

You can use a multiplication table.

The factors are along the top row and down the first column on the left.

The products fill out the rest of the table.

So, $6 \times 6 = 36$.

		Factors										
		0	1	2	3	4	5	6	7	8	9	10
Factors	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

You can use the multiplication table to find the product of 0 and a factor.

Look at the products for 0 in the multiplication table.

Notice that any number times 0 is equal to 0.

For example, $3 \times 0 = 0$.

You can also use the multiplication table to find the product of 1 and a factor.
Look at the products for 1 in the multiplication table.

Notice that any number times 1 is that number.

For example, $9 \times 1 = 9$.

Example 1

Find the product.

$$5 \times 10 = \square$$

Strategy Use a multiplication table.

Look at the 5s row. Find the 10s column.

Now, find the box where the row and the column meet.

The number inside the box, 50, is the product.

Solution $5 \times 10 = 50$

When you multiply any whole number by 10, the product is the whole number with a zero written in the ones place.

For example, $5 \times 10 = 50$.

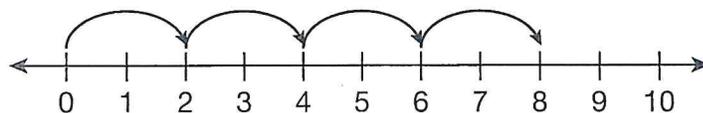
Example 2

Find the product.

$$4 \times 2 = \square$$

Strategy Use skip counting.

Use a number line to skip count by 2s four times.

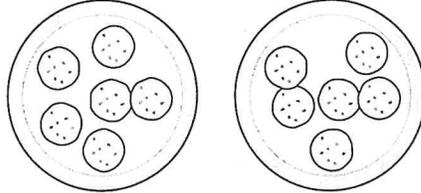


Solution $4 \times 2 = 8$

When you multiply by 2, you can use doubling to find the product.

Example 3

How many cookies are there in all?



Strategy Use doubling.

Step 1

Look at the picture.

There are 2 plates.

Each plate has 6 cookies.

Step 2

Double 6.

$$6 + 6 = 12$$

Step 3

Write a multiplication sentence.

2 groups of 6 equals 12.

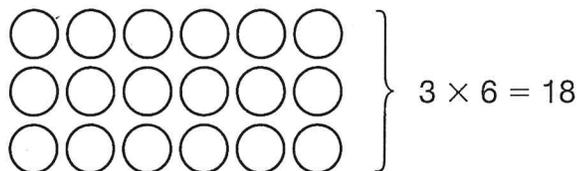
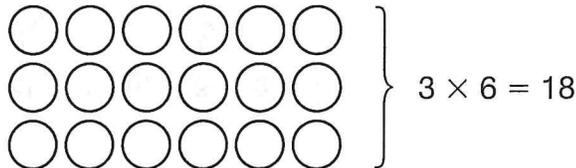
$$2 \times 6 = 12$$

Solution There are 12 cookies in all.

$$2 \times 6 = 12$$

You can double a multiplication fact you already know to find a new fact.

$$6 \times 6 = 36$$



Example 4

Find the product.

$$8 \times 7 = \square$$

Strategy Double a known fact.

One of the factors is 8.

8 is a double of 4.

Think of a known fact: 4×7 .

$$4 \times 7 = 28$$

8 is the double of 4, so double the product of 4×7 .

$$28 + 28 = 56, \text{ so } 8 \times 7 = 56.$$

Solution $8 \times 7 = 56$

You can find a missing factor or product in a multiplication problem using a variety of strategies. A missing number can be represented by a box (\square) or a letter (x).

Example 5

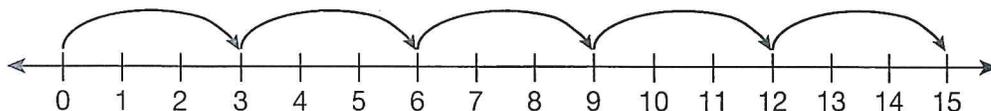
Find the missing factor.

$$\square \times 3 = 15$$

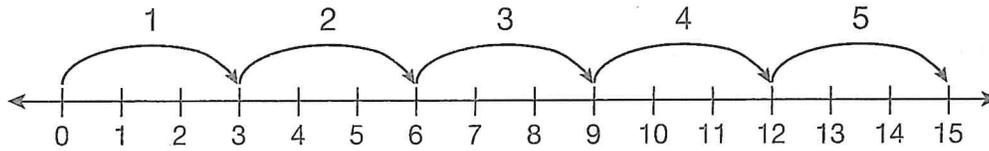
Strategy Use skip counting.

Use a number line to skip count by 3s.

Skip count by 3 until you reach 15.



Step 2 Count the number of times you skip counted.



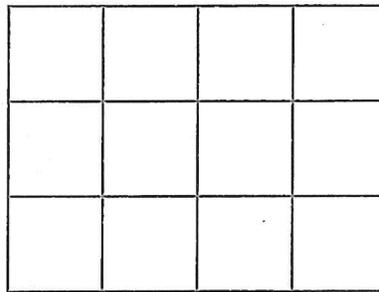
You skip counted 5 times.
5 is the missing factor.

Solution $5 \times 3 = 15$



Coached Example

Write a multiplication sentence for this model.



How many rows are there? _____

How many squares are in each row? _____

Use skip counting to find the total number of squares.

_____, _____, _____

The model shows the multiplication sentence _____ \times _____ = _____.



Lesson Practice Part 1

Choose the correct answer.

1. Find the product.

$$3 \times 3 = \square$$

- A. 6
- B. 9
- C. 11
- D. 30

2. Find the product.

$$2 \times 9 = \square$$

- A. 11
- B. 18
- C. 29
- D. 92

3. Find the missing factor.

$$6 \times \square = 42$$

- A. 4
- B. 5
- C. 6
- D. 7

4. Find the product.

$$6 \times 10 = \square$$

- A. 6
- B. 10
- C. 16
- D. 60

5. Find the product.

$$4 \times 5 = \square$$

- A. 9
- B. 15
- C. 20
- D. 45

6. Find the product.

$$8 \times 8 = \square$$

- A. 88
- B. 64
- C. 18
- D. 16

7. Find the product.

$$9 \times 5 = \square$$

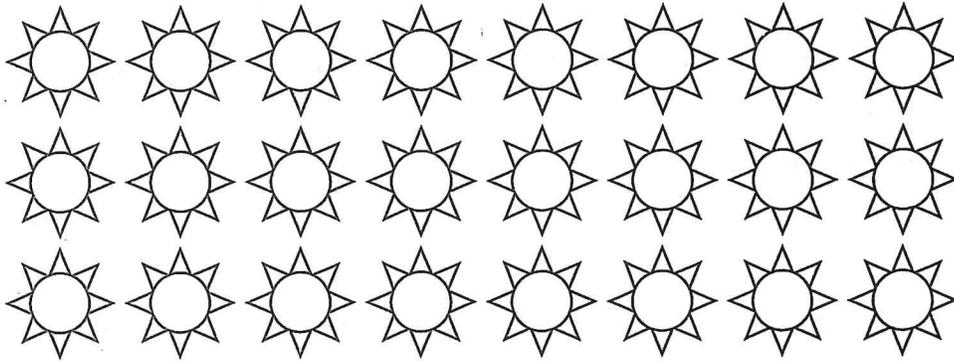
- A. 14
- B. 35
- C. 40
- D. 45

8. Find the missing factor.

$$\square \times 2 = 14$$

- A. 12
- B. 7
- C. 4
- D. 2

9. Look at the array below.



A. Skip count to find how many in all.

_____ , _____ , _____

B. Write a multiplication fact for this array.

_____ \times _____ = _____



Lesson Practice Part 2

Choose the correct answer.

- A factor is multiplied by 1. What is the relationship between the factor and the product?
 - The product is 1 less than the factor.
 - The product is equal to the factor.
 - The product is 1 more than the factor.
 - The product is double the factor.
- Find the product.
$$9 \times 6 = \square$$
 - 45
 - 48
 - 54
 - 56
- Find the missing factor.
$$7 \times \square = 28$$
 - 6
 - 5
 - 4
 - 3
- A factor is multiplied by 0. What is the relationship between the factor and the product?
 - The product is 0 no matter what the factor is.
 - The product is equal to the factor.
 - The product is 1 more than the factor.
 - The product is 1 no matter what the factor is.
- Which product is **not** equal to 16?
 - 2×8
 - 3×5
 - 4×4
 - 8×2
- Which fact can be doubled to find the product of 6×8 ?
 - 2×8
 - 3×4
 - 4×4
 - 6×4

7. Find the product.

$$5 \times 7 = \square$$

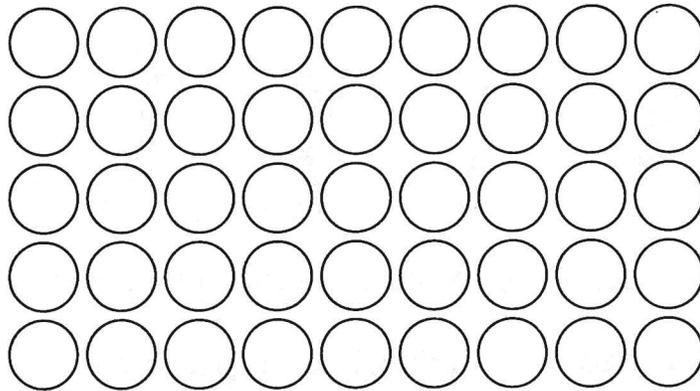
- A. 25
- B. 30
- C. 35
- D. 40

8. Find the missing factor.

$$\square \times 4 = 32$$

- A. 8
- B. 7
- C. 6
- D. 5

9. Look at the array.



A. Write a multiplication fact for this array.

B. Explain why your multiplication fact represents the array and is correct.

Multiplication Patterns

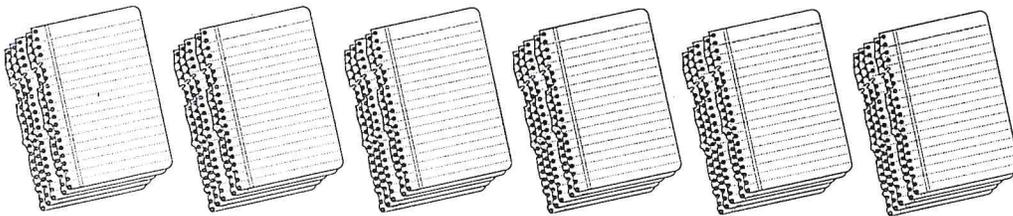


Getting the Idea

If you add the same number to itself over and over, you are creating a pattern. Since multiplication is another way to do repeated addition, you can use multiplication as a shortcut.

Example 1

There are 5 pieces of paper in each pile.

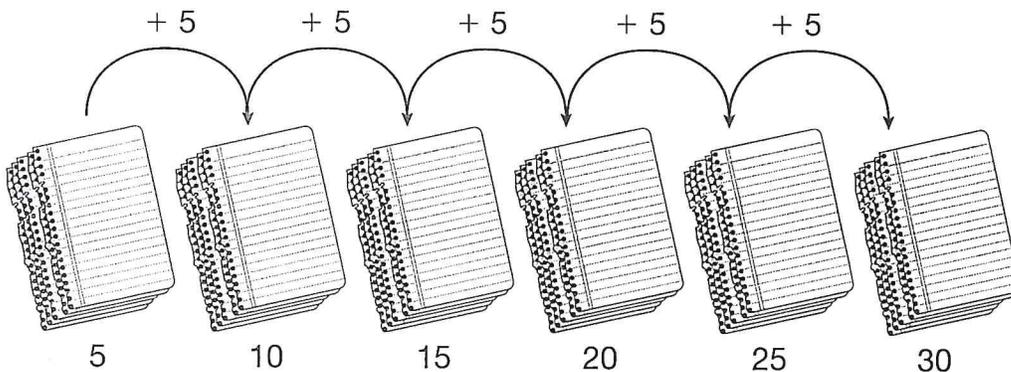


Write a multiplication sentence to show the total number of pieces in 6 piles.

Strategy Relate repeated addition to multiplication.

Find the number of pieces in 6 piles.

There are 5 pieces in each pile. The rule is add 5.



Step 2

Use multiplication to show the total number of pieces.

number of piles \times pieces in each pile = total

1	\times	5	= 5
2	\times	5	= 10
3	\times	5	= 15
4	\times	5	= 20
5	\times	5	= 25
6	\times	5	= 30

Solution The sentence $6 \times 5 = 30$ shows the total number of pieces in 6 piles.

You can use a table to show number patterns. Each pair of numbers in the table follows the same rule. Use the rule to find a missing number or continue a pattern.

For example, the table below shows that 1 bicycle has 2 tires, 2 bicycles have a total of 4 tires, 3 bicycles have a total of 6 tires, and 4 bicycles have a total of 8 tires. How many tires do 5 bicycles have?

Bicycle Tires

Number of Bicycles	Number of Tires
1	2
2	4
3	6
4	8

The rule of the table is multiply the number of bicycles by 2 to find the total number of tires.

Rule: number of bicycles \times 2 = total number of tires

Use the rule to find how many tires 5 bicycles have.

$$5 \times 2 = 10$$

So, 5 bicycles have 10 tires.

Example 2

This table shows the total amount of milk needed to make different numbers of cakes.

Number of Cakes	Cups of Milk
1	3
2	6
3	9
4	12

How many cups of milk in all are needed to make 5 cakes?

Strategy Find the rule.

Step 1 Find the number of cups of milk for 1 cake.

3 cups of milk are needed for 1 cake.

Step 2 Look at the pattern for the rest of the numbers.

As the number of cakes increases by 1, the cups of milk increase by 3.

Step 3 Find the rule.

The rule is number of cakes \times 3 cups = total cups of milk.

Step 4 Use the rule to find the total cups of milk for 5 cakes.

5 cakes \times 3 cups = 15 cups

Solution 15 cups of milk are needed to make 5 cakes.

There are many patterns in a multiplication table.

For example, look at the products in the 4 row.

The numbers increase by 4 as you go from left to right.

×	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	<u>14</u>	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	<u>14</u>	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

The bold numbers are the products of two equal factors, such as $3 \times 3 = 9$. Notice the products as you move diagonally from top left to bottom right. The numbers alternate between odd and even numbers.

Notice also that the products on one side of the diagonal are the same as the products on the other side of the diagonal.

For example, $7 \times 2 = 14$ and $2 \times 7 = 14$.

Example 3

When you multiply a number by 6, the product will always be an even number.

Show the product of 6×3 as the sum of two equal addends.

Strategy Find the product and split it into two equal parts.

Step 1 Find the product of 6×3 .

$$6 \times 3 = 18$$

Step 2 Show 18 as the sum of two equal addends.

“Two equal addends” means the addends are the same.

Think: $? + ? = 18$

$$9 + 9 = 18$$

Solution The product of 6×3 can be shown as $9 + 9 = 18$.



Coached Example

This table shows the total number of legs for different numbers of spiders.

Spider Legs

Number of Spiders	Number of Legs
1	8
3	24
5	40
7	56

How many legs in all do 9 spiders have?

One spider has _____ legs.

Find the rule.

The rule is number of spiders \times _____ = total number of legs.

Use the rule to check the numbers in the table.

$$1 \times \underline{\hspace{2cm}} = 8$$

$$3 \times \underline{\hspace{2cm}} = 24$$

$$5 \times \underline{\hspace{2cm}} = 40$$

$$7 \times \underline{\hspace{2cm}} = 56$$

Use the rule to find the total number of legs that 9 spiders have.

$$9 \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

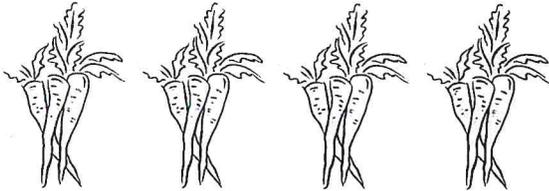
Nine spiders have _____ legs in all.



Lesson Practice Part 1

Choose the correct answer.

1. There are 3 carrots in each bunch.



Which shows how many carrots are in 4 bunches?

- A. $3 + 3 = 6$
 - B. $4 \times 2 = 8$
 - C. $4 \times 3 = 12$
 - D. $8 \times 2 = 16$
2. Each muffin has 3 raisins on it.
- 
- How many raisins are on 5 muffins?
- A. 10
 - B. 12
 - C. 15
 - D. 18
3. Which is the same as the product of 4×3 ?
- A. $5 + 2$
 - B. $7 + 7$
 - C. $8 + 6$
 - D. $6 + 6$

Use the table below for questions 4 and 5.

Kate uses the same number of cups of pecans for each pie. The table shows the total cups of pecans for different numbers of pies.

Number of Pies	Cups of Pecans
1	3
2	6
3	9
4	12

4. What is the rule of the table?
- A. number of pies $\times 3 =$ cups of pecans
 - B. number of pies $+ 3 =$ cups of pecans
 - C. number of pies $\times 6 =$ cups of pecans
 - D. number of pies $+ 9 =$ cups of pecans
5. How many cups of pecans are needed for 6 pies?
- A. 14 cups
 - B. 15 cups
 - C. 17 cups
 - D. 18 cups

6. Samantha recorded the number of miles she ran.

Miles Run

Number of Days	Number of Miles
2	4
4	8
6	12
8	16

If the pattern continues, how many miles will Samantha run in 10 days?

- A. 18 miles C. 22 miles
 B. 20 miles D. 24 miles

7. Which sentence is true?

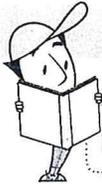
- A. A number times 2 is always an even number.
 B. A number times 5 is always an even number.
 C. A number times 7 is always an odd number.
 D. A number times 8 is always an odd number.

8. Joann is making a quilt out of squares. Each square is made by sewing triangles together. The table shows how many triangles are needed to make different numbers of squares.

Number of Squares	Number of Triangles
2	4
4	8
6	12
8	16

- A. How many triangles are needed to make 7 squares? Explain your answer.

- B. Is the number of triangles needed for 7 squares odd or even? Explain your answer.



Lesson Practice Part 2

Choose the correct answer.

- Which will always result in an odd number?
 A. odd \times odd
 B. odd \times even
 C. even \times odd
 D. even \times even
- Each volleyball team has 6 players. How many volleyball players are needed for 6 teams?
 A. 12
 B. 24
 C. 36
 D. 66
- Each car has 4 wheels. How many total wheels do 7 cars have?
 A. 11 C. 24
 B. 21 D. 28
- Len multiplied a whole number by 9. Which number is definitely **not** the product?
 A. 18 C. 52
 B. 36 D. 63

Use the table below for questions 5 and 6.

The table shows the total cost for a family beach pass for different numbers of family members.

Number of People	Cost (in dollars)
2	16
3	24
4	32
5	40

- What is the rule of the table?
 A. number of people \times 8 = cost in dollars
 B. number of people + 14 = cost in dollars
 C. number of people \times 16 = cost in dollars
 D. number of people + 35 = cost in dollars
- What is the cost for a family of 7?
 A. \$48 C. \$64
 B. \$56 D. \$72

7. Two numbers are multiplied. Neither number is 0. Which sentence is true?
- A. If the ones digit in the product is 5, then 2 must be one of the factors.
 - B. If the ones digit in the product is 5, then 5 must be one of the factors.
 - C. If the ones digit in the product is 0, then 5 can not be one of the factors.
 - D. If the ones digit in the product is 0, then 2 can not be one of the factors.

8. Jo recorded the number of miles she biked.

Miles Biked

Number of Days	Number of Miles
2	20
4	40
6	60

If the pattern continues, how many miles will Jo bike in 10 days?

9. Rob uses the same number of songs for each playlist. The table shows the number of songs that are needed to make different numbers of playlists.

Songs on Playlists

Number of Playlists	Number of Songs
3	27
5	45
7	63

- A. If the pattern continues, how many songs will Rob use for 9 playlists? Explain your reasoning.
-

- B. If the pattern continues, will the number of songs always be an odd number? Explain your reasoning.
-

Multiplication Word Problems



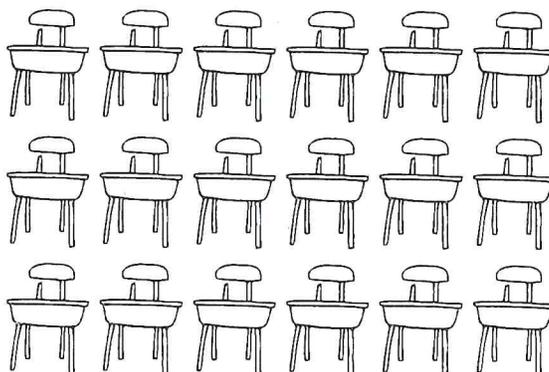
Getting the Idea

With word problems, look carefully to see if there are equal groups. If so, you can write a multiplication sentence to solve the problem.

When you write a multiplication sentence, remember to use a symbol or letter to represent the unknown number.

Example 1

In a classroom, there are 3 rows of student desks. There are 6 student desks in each row.



How many student desks are in the classroom?

Strategy Write a multiplication sentence. Then multiply.

Step 1 Write a multiplication sentence.

There are 3 rows. There are 6 desks in each row.

number of rows \times number in each row = total number

$$3 \quad \times \quad 6 \quad = \quad \square$$

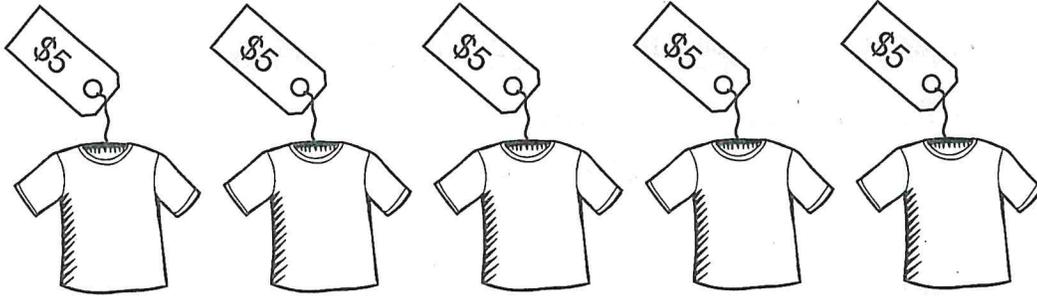
Step 2 Multiply.

$$3 \times 6 = 18.$$

Solution There are 18 student desks in the classroom.

Example 2

Mr. Cole bought 5 T-shirts. Each T-shirt costs \$5.



How much did Mr. Cole spend in all on T-shirts?

Strategy Write a multiplication sentence. Then multiply.

Step 1

Write a multiplication sentence. Use the symbol \square for the product.

5 shirts at \$5 each = 5 groups of 5

$$5 \times 5 = \square$$

Step 2

Multiply.

$$5 \times 5 = 25.$$

Solution Mr. Cole spent \$25 on 5 T-shirts.

Example 3

Three groups signed up to hike on a trail. Each group has 7 people. How many people in all are on the trail?

Strategy Write a multiplication sentence. Then multiply.

Step 1

Write a multiplication sentence.

3 groups of 7 people = 3 groups of 7

$$3 \times 7 = \square$$

Step 2

Multiply.

$$3 \times 7 = 21.$$

Solution There are 21 people on the trail in all.

Multiplication can be used to compare.

Example 4

Sally's ribbon is 4 inches long. Tania's ribbon is 6 times as long as Sally's. How long is Tania's ribbon?

Strategy Write a multiplication sentence. Then use repeated addition.

Step 1

Write a multiplication sentence.

You know Sally's ribbon is 4 inches long and Tania's ribbon is 6 times as long.

6 times as long as 4 is the same as 6×4 .

$$6 \times 4 = \square$$

Step 2

Multiply.

$$6 \times 4 = 24.$$

Solution Tania's ribbon is 24 inches long.

Example 5

Daniel has 2 fish tanks. He has 12 fish in each tank. James has fewer fish than Daniel. Together they have 32 fish. How many fish does James have?

Strategy Write number sentences to model the problem.

Step 1

First, find the number of fish Daniel has.

Write and solve a multiplication sentence.

Use the symbol \square for the product.

You know Daniel has 2 fish tanks with 12 fish in each tank.

$$2 \times 12 = \square$$

$$2 \times 12 = 24$$

Step 2

Next, find the number of fish James has.

Write and solve a subtraction sentence.

Use the symbol \square for the difference.

You know that together they have 32 fish.

$$32 - 24 = \square$$

$$32 - 24 = 8$$

Solution James has 8 fish.

**Coached Example**

At Buddy's Bakery a cookie costs \$2. A cake costs 4 times as much as a cookie. How much does a cake cost at Buddy's Bakery?

Write a multiplication sentence.

A cookie costs \$_____ and a cake costs _____ times as much.

$$\underline{\hspace{2cm}} \times \underline{\hspace{2cm}} = \square$$

$$\underline{\hspace{2cm}} \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

A cake costs \$_____ at Buddy's Bakery.



Lesson Practice Part 1

Choose the correct answer.

- Kelly baked 5 trays of muffins. Each tray holds 6 muffins. How many muffins did Kelly bake in all?
 A. 11
 B. 25
 C. 30
 D. 50
- Mr. Field's garden has 8 rows of plants. Each row has 10 plants. How many plants does Mr. Field's garden have in all?
 A. 18
 B. 40
 C. 70
 D. 80
- Steven bought 3 bags of potatoes. Each bag has 7 potatoes. How many potatoes did Steven buy in all?
 A. 10
 B. 21
 C. 28
 D. 30
- Ebony has 7 bookshelves. She has 9 books on each shelf. Whitney has 12 more books than Ebony. How many books does Whitney have?
 A. 75
 B. 63
 C. 51
 D. 28
- A toy car costs \$5. A toy helicopter costs 3 times as much. How much does a toy helicopter cost?
 A. \$10
 B. \$15
 C. \$20
 D. \$30
- Jesse's flower is 7 inches tall. Ted's flower is 2 times as tall as Jesse's. How tall is Ted's flower?
 A. 7 inches
 B. 9 inches
 C. 10 inches
 D. 14 inches

7. There are 5 parents driving the students from Ms. Alvarez's class to a play. There are 4 students in each car. How many students from Ms. Alvarez's class are going to the play?
- A. 20
- B. 24
- C. 25
- D. 30
8. There are 10 players on each basketball court. How many players are there on 6 basketball courts?
- A. 30
- B. 50
- C. 60
- D. 80
-
9. There are 4 lemon trees in Rasheed's backyard. There are 12 lemons growing on each tree.
- A. Draw a model of the problem.

- B. Write a multiplication sentence for the problem. Use the symbol \square for the product.

$$\underline{\hspace{2cm}} \times \underline{\hspace{2cm}} = \square$$

- C. How many lemons in all are growing in Rasheed's backyard?
-



Lesson Practice Part 2

Choose the correct answer.

- Liz has two tomato plants in her garden. One is 8 inches tall. The other is 2 times as tall. What is the height of the taller tomato plant?
 A. 4 inches
 B. 6 inches
 C. 10 inches
 D. 16 inches
- Matt has only nickels and dimes in a jar. He has 6 stacks of 9 dimes each. He has 15 more dimes than nickels. How many nickels does Matt have?
 A. 15 C. 54
 B. 39 D. 69
- Each debate team has 3 members. There are 6 teams. James said he could multiply 6×3 to find the number of members. Tia said that she could add $6 + 6 + 6$ to find the number of members. Who is correct?
 A. James only
 B. Tia only
 C. Both are correct.
 D. Neither is correct.
- There are 7 days in a week. Cecilia's vacation will last 3 weeks and 4 days. How long will Cecilia's vacation last?
 A. 25 days
 B. 21 days
 C. 19 days
 D. 17 days
- Each package contains 8 hot dogs. Mr. Carson bought 5 packages of hot dogs for a barbeque. How many hot dogs did Mr. Carson buy?
 A. 30
 B. 35
 C. 40
 D. 45
- A chessboard has 8 rows of small squares. Each row has 8 small squares. How many small squares are on the chessboard?
 A. 64
 B. 56
 C. 48
 D. 16

7. Sasha bought 6 dozen eggs to color. There are 12 in a dozen. Which describes how Sasha can find the total number of eggs that she bought?
- A. Multiply 3×6 and then add the product to itself.
 - B. Multiply 6×6 and then add the product to itself.
 - C. Multiply 3×6 and then multiply the product times itself.
 - D. Multiply 6×6 and then multiply the product times itself.
8. A group of 4 friends went to the movies. Each ticket cost \$9. They also shared a snack that cost \$6. How much money did the group spend in all?
- A. \$30
 - B. \$42
 - C. \$50
 - D. \$58

9. Vanessa and Zoe jog a 6-mile course. Vanessa jogs 6 days each week and Zoe jogs 4 days each week.

A. How many miles does Vanessa jog each week? Show your work.

B. How many more miles does Vanessa jog than Zoe each week? Explain how you found your answer.

Multiplication Properties



Getting the Idea

You can use multiplication properties to help you learn basic facts.

The **commutative property of multiplication** says that changing the order of factors does not change the product.

$$\begin{array}{ccc}
 \bullet & \bullet & \bullet & \bullet \\
 \bullet & \bullet & \bullet & \bullet \\
 \bullet & \bullet & \bullet & \bullet \\
 3 \times 4 = 12 & = & \bullet & \bullet & \bullet \\
 & & \bullet & \bullet & \bullet \\
 & & \bullet & \bullet & \bullet \\
 & & 4 \times 3 = 12
 \end{array}$$

Example 1

What number makes the sentence true?

$$2 \times 5 = \square \times 2$$

Strategy Use the **commutative property of multiplication**.

The commutative property of multiplication says that changing the order of factors does not change the product.

$$2 \times 5 = 10, \text{ so } 5 \times 2 = 10$$

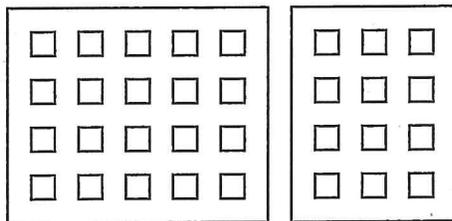
Solution The number **5** makes the sentence true.

You can use the commutative property to learn multiplication facts. Look at the shaded row and column in the multiplication table below. The multiplication facts for 3s have the same factors and products. This is true for all multiplication facts. For example, when you know the multiplication fact $3 \times 6 = 18$, you also know the multiplication fact $6 \times 3 = 18$.

		Columns									
×	1	2	3	4	5	6	7	8	9	10	
1	1	2	3	4	5	6	7	8	9	10	
2	2	4	6	8	10	12	14	16	18	20	
3	3	6	9	12	15	18	21	24	27	30	
4	4	8	12	16	20	24	28	32	36	40	
5	5	10	15	20	25	30	35	40	45	50	
6	6	12	18	24	30	36	42	48	54	60	
7	7	14	21	28	35	42	49	56	63	70	
8	8	16	24	32	40	48	56	64	72	80	
9	9	18	27	36	45	54	63	72	81	90	
10	10	20	30	40	50	60	70	80	90	100	

The **distributive property of multiplication** says that multiplying a sum by a factor is the same as multiplying each addend by the factor and adding the products.

For example, use the distributive property to find 4×8 .



Rename one of the factors as the sum of two addends.

$$4 \times (5 + 3)$$

Multiply the other factor by each addend.

$$(4 \times 5) + (4 \times 3)$$

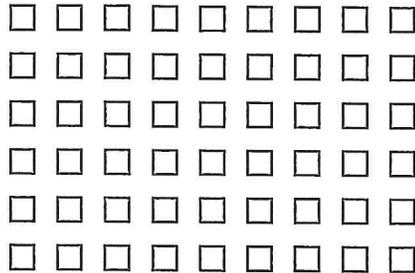
Add the products.

$$20 + 12 = 32$$

Example 2

Find the product.

$$6 \times 9 = \square$$



Strategy Use the distributive property of multiplication.

Step 1

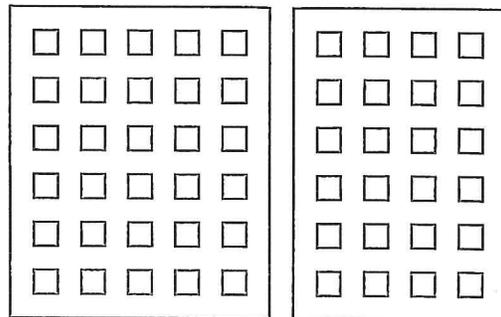
Rename one of the factors as the sum of two numbers.

Distribute the factor 6 to both numbers.

$$6 \times 9$$

$$6 \times (5 + 4)$$

$$(6 \times 5) + (6 \times 4)$$

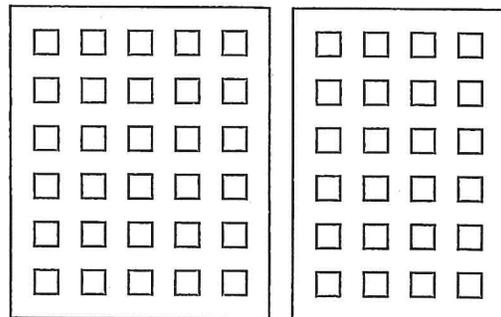


Step 2

Multiply each fact.

$$(6 \times 5) + (6 \times 4)$$

$$30 + 24$$



$$6 \times 5 = 30$$

$$6 \times 4 = 24$$

Step 3

Add the products.

$$30 + 24 = 54$$

Solution $6 \times 9 = 54$

Example 3

Karen can't remember the product for 8×9 , so she breaks the factor 9 into $4 + 5$. What is $8 \times (4 + 5)$?

Strategy Use the distributive property.

Step 1 Distribute the factor 8 to both numbers inside the parentheses.

$$\begin{aligned} 8 \times (4 + 5) \\ (8 \times 4) + (8 \times 5) \end{aligned}$$

Step 2 Multiply each fact.

$$\begin{aligned} (8 \times 4) + (8 \times 5) \\ 32 + 40 \end{aligned}$$

Step 3 Add the products.

$$32 + 40 = 72$$

Solution $8 \times 9 = 8 \times (4 + 5) = 72$

**Coached Example**

$4 \times 9 = 36$. What is the product of 9×4 ?

Look at $4 \times 9 = 36$.

The factors are _____ and _____.

Look at $9 \times 4 = \square$.

The factors are _____ and _____.

The factors are the same, but the order of the factors is different.

The commutative property of multiplication says that changing the _____ of the factors does not change the product.

So, $9 \times 4 =$ _____.

The product of 9×4 is _____.



Lesson Practice Part 1

Choose the correct answer.

1. Which is the missing number?

$$4 \times 5 = \square \times 4$$

- A. 0
- B. 1
- C. 4
- D. 5

2. Find the product.

$$2 \times (4 + 6) = \square$$

- A. 20
- B. 12
- C. 10
- D. 8

3. If $7 \times 4 = 28$, what is 4×7 ?

- A. 21
- B. 24
- C. 27
- D. 28

4. What number belongs in the \square ?

$$3 \times 8 = \square \times 3$$

- A. 3
- B. 5
- C. 8
- D. 11

5. Which is the missing number?

$$6 \times 9 = (6 \times 4) + (6 \times \square)$$

- A. 4
- B. 5
- C. 6
- D. 9

6. What number belongs in the \square ?

$$1 \times \square = 5$$

- A. 0
- B. 1
- C. 5
- D. 25

7. Which has the same product as this sentence?

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

- A. $(7 + 2) + (7 + 5) = \square$
 B. $(7 + 2) \times (7 \times 5) = \square$
 C. $(7 \times 2) \times (7 \times 5) = \square$
 D. $(7 \times 2) + (7 \times 5) = \square$

8. Which is the missing number?

$$\square \times 6 = 6 \times 1$$

- A. 6
 B. 2
 C. 1
 D. 0

9. Bianca cannot remember the product of 8×6 . She decides to use the distributive property of multiplication to help.

- A. Show how Bianca could rewrite the multiplication sentence using the distributive property.
-

- B. Solve the problem. Show your work.



Lesson Practice • Part 2

Choose the correct answer.

1. Which is the missing number?

$$5 \times 7 = \square \times 5$$

- A. 0
- B. 1
- C. 5
- D. 7

2. Which is the missing number?

$$7 \times 6 = (7 \times 3) + (7 \times \square)$$

- A. 3
- B. 4
- C. 6
- D. 7

3. Find the product.

$$5 \times (2 + 6) = \square$$

- A. 42
- B. 40
- C. 32
- D. 16

4. Julio is going to multiply an even number by an odd number by using the distributive property. Julio said it is better to break apart the even number. Which best describes Julio's statement?

- A. Julio is correct because the even number can be broken into equal parts.
- B. Julio is correct because the odd number can be broken into equal parts.
- C. Julio is incorrect because the even number cannot be broken into equal parts.
- D. Julio is incorrect because the odd number cannot be broken into equal parts.

5. Which is equal to this number sentence?

$$6 \times (3 + 4) = \square$$

- A. $(6 + 3) \times (6 + 4) = \square$
- B. $(6 \times 3) \times (6 \times 4) = \square$
- C. $(6 \times 3) + (6 \times 4) = \square$
- D. $(6 + 3) + (6 + 4) = \square$

6. What number belongs in the \square ?

$$7 \times \square = 9 \times 7$$

- A. 2
 B. 7
 C. 9
 D. 63

7. If $3 \times 8 = 24$, what is 8×3 ?

- A. 21
 B. 24
 C. 27
 D. 32

8. Which is the missing number?

$$\square \times 4 = 4 \times 3$$

- A. 7
 B. 4
 C. 3
 D. 1

9. Which is equal to this number sentence?

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

- A. $3 \times 7 = \square$
 B. $6 \times 3 = \square$
 C. $6 \times 7 = \square$
 D. $8 \times 5 = \square$

10. Which is the missing number?

$$5 \times 8 = (5 \times \square) + (5 \times \square)$$

- A. 2
 B. 4
 C. 5
 D. 8

11. There were 8 groups of people cleaning Berry Park on Saturday. Each group had 9 people.

- A. Write a multiplication sentence using the distributive property to show how many people helped to clean Berry Park.

- B. How many people helped to clean Berry Park?

Multiply by Multiples of 10



Getting the Idea

A multiple of 10 is the product of 10 and any number.

All numbers with a 0 in the ones place are multiples of 10, such as 10, 40, and 800.

You can use models to help you multiply multiples of 10.

Example 1

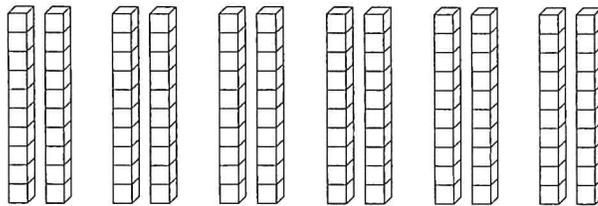
Find the product.

$$6 \times 20 = \square$$

Strategy Use models.

Step 1

Show 6 groups of 2 tens.



Step 2

Count the tens.

There are 12 tens.

$$12 \text{ tens} = 120$$

Solution $6 \times 20 = 120$

You can also use a basic fact and place value to find 6×20 .

Think about the basic fact $6 \times 2 = 12$.

$$6 \times 2 \text{ ones} = 12 \text{ ones} = 12$$

$$6 \times 2 \text{ tens} = 12 \text{ tens} = 120$$

Example 2

Multiply.

$$3 \times 90 = \square$$

Strategy Use a multiplication fact and place value.

Step 1

Think of a basic fact.

$$3 \times 9 = 27$$

Step 2

Use place value.

$$3 \times 9 \text{ ones} = 27 \text{ ones} = 27$$

$$3 \times 9 \text{ tens} = 27 \text{ tens} = 270$$

Solution $3 \times 90 = 270$

Example 3

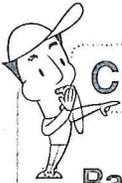
Each marching band has 40 members.
How many members are in 5 marching bands?

Strategy Use a basic fact and mental math.

Step 1 Decide how to solve the problem.
Find 5 groups of 40.
So, find 5×40 .

Step 2 Use a basic fact and place value.
Think: $5 \times 4 = 20$
 5×4 ones = 20 ones = 20
 5×4 tens = 20 tens = 200

Solution There are 200 members in 5 marching bands.



Coached Example

Rachel made 30 bags of treats. She put 5 treats in each bag.
How many treats did Rachel bag in all?

Decide how to solve the problem.

Find 30 groups of _____.

So, find _____ \times _____.

Use a basic fact.

Think: $3 \times 5 =$ _____

Use place value.

_____ ones $\times 5 =$ _____ ones = _____

_____ tens $\times 5 =$ _____ tens = _____

Rachel bagged _____ treats in all.

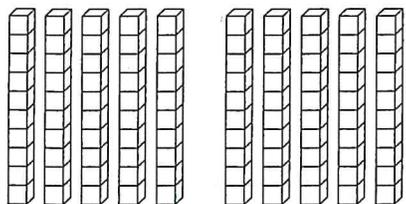


Lesson Practice • Part 1

Choose the correct answer.

1. Find the product.

$$2 \times 50 = \square$$



- A. 52
 B. 90
 C. 100
 D. 120
2. Find the product.
- $$3 \times 10 = \square$$
- A. 3
 B. 10
 C. 30
 D. 300
3. Find the product.
- $$7 \times 50 = \square$$
- A. 35
 B. 75
 C. 120
 D. 350

4. Find the product.

$$80 \times 4 = \square$$

- A. 320
 B. 240
 C. 120
 D. 32

5. Find the product.

$$70 \times 8 = \square$$

- A. 56
 B. 78
 C. 150
 D. 560

6. Ali delivers 30 newspapers each day. How many papers does she deliver in 6 days?

- A. 150
 B. 180
 C. 200
 D. 210

7. Mr. Davis drives 20 miles round-trip for work each day. How many miles does he drive for work in 5 days?

- A. 10 miles
- B. 70 miles
- C. 100 miles
- D. 170 miles

8. Which sentence does **not** have the same product as the others?

- A. $4 \times 90 = \square$
- B. $5 \times 70 = \square$
- C. $6 \times 60 = \square$
- D. $9 \times 40 = \square$

9. Maureen can type 40 words a minute. She wants to know how many words she can type in 9 minutes.

A. Which basic fact can you use to find how many words Maureen can type in 9 minutes?

B. How many words can Maureen type in 9 minutes? Show your work.



Lesson Practice • Part 2

Choose the correct answer.

- Odette played the piano for 40 minutes each day for 6 days last week. What is the total amount of time that she practiced the piano last week?
 - A. 180 minutes
 - B. 200 minutes
 - C. 240 minutes
 - D. 280 minutes
- Which is another way of writing 7×50 ?
 - A. 7×5 tens
 - B. 7×50 tens
 - C. $7 + 5$ tens
 - D. $7 + 50$ tens
- Find the product.

$$9 \times 50 = \square$$
 - A. 320
 - B. 360
 - C. 450
 - D. 490
- Each bag contains 60 balloons. What is the total number of balloons in 5 bags?
 - A. 360
 - B. 300
 - C. 36
 - D. 30
- A comedy program is on for 30 minutes each day 4 days a week. How many minutes is the comedy program on each week?
 - A. 150 minutes
 - B. 120 minutes
 - C. 90 minutes
 - D. 80 minutes
- Which sentence is equal to $7 \times 70 = \square$?
 - A. $7 \times 7 + 10 = \square$
 - B. $(7 + 7) \times 10 = \square$
 - C. $7 + (7 + 10) = \square$
 - D. $7 \times 7 \times 10 = \square$

7. Each play ticket costs \$50. How much money does 4 play tickets cost?

- A. \$54 C. \$200
 B. \$150 D. \$250

8. Which sentence has a product that is different from the others?

- A. $3 \times 80 = \square$
 B. $4 \times 60 = \square$
 C. $6 \times 40 = \square$
 D. $7 \times 30 = \square$

9. Kathy joined a gym for 3 months. The cost is \$30 each month. What is the total cost for the 3-month membership?

- A. \$90 C. \$33
 B. \$60 D. \$27

10. Each day Lionel takes 40 penalty kicks. How many penalty kicks does he take in 8 days?

- A. 360 C. 280
 B. 320 D. 240

11. Science fair projects are due today. Nina spent 80 minutes each day for 6 days working on her project. Ted spent 60 minutes each day for 8 days working on his project.

A. Write a basic fact that can be used to find the total number of minutes that Nina spent on her science fair project.

B. Write a basic fact that can be used to find the total number of minutes that Ted spent on his science fair project.

C. Who spent a greater amount of time on their science project? Explain your reasoning.

Multiply Three Numbers



Getting the Idea

Sometimes you may have to multiply three factors to find a product. When this happens, first multiply two of the factors, and then multiply the product of those two factors by the third factor.

For example, find the product of $6 \times 3 \times 4$.

First multiply two factors.

$$6 \times 3 = 18$$

Then multiply the product of the two factors by the other factor.

$$18 \times 4 = 72$$

So, $6 \times 3 \times 4 = 72$.

You can use models to find the product of 3 factors.

Example 1

Find the product.

$$2 \times 3 \times 5 = \square$$

Strategy Use models.

Step 1

Multiply two factors.

2 rows of 3 counters

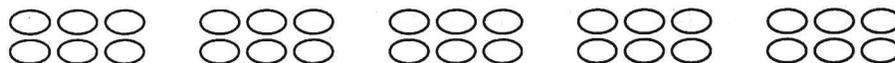


$$2 \times 3 = 6$$

Step 2

Multiply the product by the other factor.

2 rows of 3 counters 5 times



$$6 \times 5 = 30$$

Solution $2 \times 3 \times 5 = 30$

Another way to multiply $2 \times 3 \times 5$ is to use the commutative property. Remember, the commutative property says that you can multiply factors in any order, and the product will not change.

Multiply $2 \times 3 \times 5$.

Change the order of factors 3 and 5. $2 \times 5 \times 3$

Multiply. $10 \times 3 = 30$

So, $2 \times 3 \times 5 = 30$.

You can also group 3 factors in different ways to help you multiply.

The **associative property of multiplication** says that changing the grouping of the factors does not change the product.

For example, $(2 \times 4) \times 3 = 2 \times (4 \times 3)$.

$$(2 \times 4) \times 3 = 8 \times 3 \qquad 2 \times (4 \times 3) = 2 \times 12$$

$$8 \times 3 = 24 \qquad 2 \times 12 = 24$$

Example 2

Find the product.

$$(7 \times 5) \times 2 = \square$$

Strategy Use the associative property of multiplication.

Step 1

Change the grouping of the factors.

Use mental math. Think: $5 \times 2 = 10$

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

Step 2

Multiply inside the parentheses.

$$7 \times (5 \times 2)$$

$$7 \times 10$$

Step 3

Multiply the product by the other factor.

$$7 \times 10 = 70$$

Solution $(7 \times 5) \times 2 = 70$



Coached Example

Find the product.

$$(6 \times 2) \times 3 = \square$$

Use the associative property of multiplication.

Change the grouping of the factors to help you multiply.

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

Multiply inside the parentheses.

$$(\underline{\hspace{2cm}} \times \underline{\hspace{2cm}}) = \underline{\hspace{2cm}}$$

Multiply the product by the other factor.

$$\underline{\hspace{2cm}} \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

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



Lesson Practice Part 1

Choose the correct answer.

1. Which shows the associative property of multiplication?

- A. $(2 \times 3) \times 4 = 2 \times (3 \times 4)$
- B. $(5 \times 9) = (9 \times 5)$
- C. $4 \times 1 = 4$
- D. $(3 \times 4) = (2 \times 6)$

2. Find the product.

$$4 \times 5 \times 3 = \square$$

- A. 4
- B. 8
- C. 12
- D. 60

3. Find the product.

$$2 \times (4 \times 2) = \square$$

- A. 6
- B. 8
- C. 10
- D. 16

4. Find the product.

$$(3 \times 4) \times 3 = \square$$

- A. 12
- B. 24
- C. 36
- D. 48

5. Which shows another way to group $(6 \times 4) \times 2$?

- A. $(6 \times 4) + (6 \times 2)$
- B. $6 \times (4 \times 2)$
- C. $(12 \times 2) \times 4$
- D. $(6 + 4) \times (4 + 2)$

6. Find the product.

$$8 \times (2 \times 3) = \square$$

- A. 6
- B. 16
- C. 24
- D. 48

7. Find the product.

$$5 \times 2 \times 6 = \square$$

- A. 60
 B. 30
 C. 12
 D. 10

8. Find the product.

$$(9 \times 1) \times 8 = \square$$

- A. 8
 B. 9
 C. 18
 D. 72

-
9. Rachael wants to solve $(4 \times 3) \times 2$. Her teacher told her to change the grouping of the factors to help her multiply.

- A. Write another way that Rachael can group the factors.

- B. Find the product of $(4 \times 3) \times 2$. Show your work.



Lesson Practice Part 2

Choose the correct answer.

- There are 3 tennis balls in each can. Each ball costs \$2. Mr. Woo bought 6 cans of tennis balls. How much money did Mr. Woo spend on the tennis balls?
 A. \$11
 B. \$24
 C. \$30
 D. \$36
- Which shows the associative property of multiplication?
 A. $4 \times (2 \times 7) = (4 \times 2) \times 7$
 B. $4 \times (2 \times 7) = 4 \times (7 \times 2)$
 C. $4 \times 7 = 4 \times (4 + 3)$
 D. $4 \times 7 \times 1 = 4 \times 7$
- Find the product.
 $6 \times 7 \times 5 = \square$
 A. 240 C. 200
 B. 210 D. 180
- Which is the missing number?
 $8 \times (5 \times 7) = (8 \times \square) \times 7$
 A. 8 C. 5
 B. 7 D. 3
- Each car on a ride contains 4 rows of seats. Each row can hold 5 people. There are 8 cars that can be filled. What is the greatest number of people that can ride at any one time?
 A. 72
 B. 80
 C. 120
 D. 160
- Find the product.
 $9 \times 4 \times 5 = \square$
 A. 150
 B. 160
 C. 180
 D. 200
- Which has the same product as $(4 \times 2) \times 8$?
 A. 8×8
 B. $4 \times (2 + 8)$
 C. $4 + (2 \times 8)$
 D. 4×10

8. Which best explains why it is helpful to change the grouping of $5 \times (4 \times 6)$ as $(5 \times 4) \times 6$?
- A. By multiplying 5×4 first, the first product is a multiple of 10.
 - B. By multiplying 5×4 first, the greatest product is multiplied last.
 - C. It is always better to multiply the even number and the odd number first.
 - D. The factors are the same, so there is no advantage in changing the grouping.
9. There are 2 rows of ice pops in each box. Each row contains 10 ice pops. What is the total number of ice pops in 4 boxes?
- A. 16
 - B. 28
 - C. 60
 - D. 80

10. Find the product.

$$2 \times 7 \times 3 = \square$$

- A. 42
- B. 35
- C. 27
- D. 20

11. Todd's room has 2 bookcases. Each bookcase has 4 shelves. Each shelf contains 6 model airplanes that Todd built.

- A. Write a number sentence that can be used to find the number of model airplanes on the shelves. Use \square to represent the product.

- B. How many model airplanes has Todd built? Explain how you found your answer.

Understand Division



Getting the Idea

You can use **division** to find the number of equal groups or the number in each equal group.

Here are the parts of a division sentence.

$$\begin{array}{ccccccc}
 6 & \div & 3 & = & 2 \\
 \text{dividend} & & \text{divisor} & & \text{quotient}
 \end{array}$$

Example 1

Find the quotient.

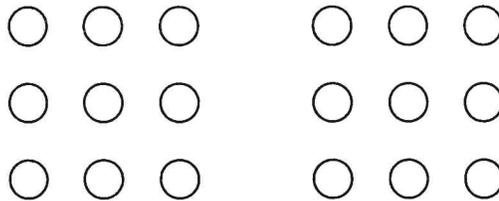
$$18 \div 2 = \square$$

Strategy Draw a picture.

Step 1

Make 18 circles to show 18.

Make 2 equal groups.



Step 2

Count how many are in each group.

There are 9 circles in each group.

Solution $18 \div 2 = 9$

You can use **repeated subtraction** to find the quotient.

Example 2

Find the quotient.

$$12 \div 3 = \square$$

Strategy Use repeated subtraction.

Step 1

Start with 12. Subtract 3 until you reach 0.

$$12 - 3 = 9$$

$$9 - 3 = 6$$

$$6 - 3 = 3$$

$$3 - 3 = 0$$

Step 2

Count the number of times you subtracted 3.

You subtracted 4 times.

Solution $12 \div 3 = 4$

You can use an array to find the number of equal groups.

Example 3

What division facts does this array of dimes show?



Strategy Count the number of dimes, rows, and dimes in each row.

Step 1

Count the total number of dimes.

There are 32 dimes.

Step 2

Count the number of rows.

There are 4 rows.

Step 3

Count the number of dimes in each row.

There are 8 dimes in each row.

Step 4

Write the division facts.

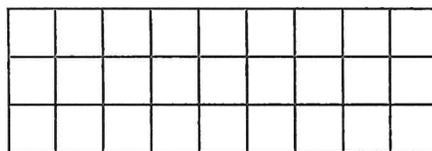
$$\begin{array}{ccccccc}
 32 & \div & 4 & = & 8 & & \\
 \text{total number of dimes} & & \text{number of rows} & & \text{number in each row} & &
 \end{array}$$

$$\begin{array}{ccccccc}
 32 & \div & 8 & = & 4 & & \\
 \text{total number of dimes} & & \text{number in each row} & & \text{number of rows} & &
 \end{array}$$

Solution The array of dimes shows $32 \div 4 = 8$ and $32 \div 8 = 4$.

Example 4

What division facts does this area model show?



Strategy Count the number of squares, rows, and squares in each row.

Step 1

Count the total number of squares.

There are 27 squares in all.

Step 2

Count the number of rows.

There are 3 rows of squares.

Step 3

Count the number of squares in each row.

There are 9 squares in each row.

Step 4

Write the division facts.

$$27 \div 3 = 9 \text{ and } 27 \div 9 = 3$$

Solution The area model shows $27 \div 3 = 9$ and $27 \div 9 = 3$.

Multiplication and division are **inverse operations**, or opposites.

Inverse operations undo each other. So you can use a multiplication fact to solve a division fact, or a division fact to solve a multiplication fact.

A **fact family** is a group of related facts that use the same numbers.

Here is the fact family for 2, 3, and 6.

$$3 \times 2 = 6$$

$$2 \times 3 = 6$$

$$6 \div 3 = 2$$

$$6 \div 2 = 3$$

Example 5

These two sentences are in the same fact family.

$$3 \times \square = 15$$

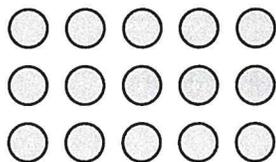
$$15 \div \square = 3$$

What number makes both sentences true?

Strategy Make an array to show the sentences.

Step 1

Draw 15 counters in 3 rows.



Step 2

Find the missing number in $3 \times \square = 15$.

3 rows of 5 counters equal 15.

$$3 \times 5 = 15$$

Step 3

Find the missing number in $15 \div \square = 3$.

The 15 counters are in 3 equal rows of 5.

$$15 \div 5 = 3$$

Solution The number 5 makes both sentences true.

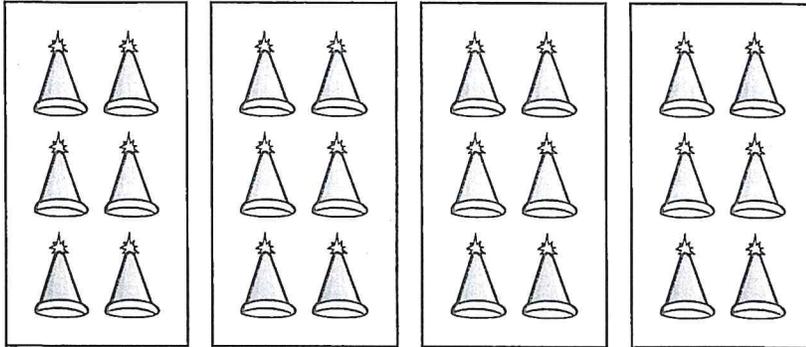
$$3 \times 5 = 15$$

$$15 \div 5 = 3$$



Coached Example

What multiplication-division fact family does this picture show?



How many equal groups of hats are there? _____

How many hats are in each group? _____

How many hats are there in all? _____

Write the multiplication facts for this picture.

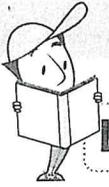
$$4 \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$\underline{\hspace{2cm}} \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

Write the division facts for this picture.

$$24 \div \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

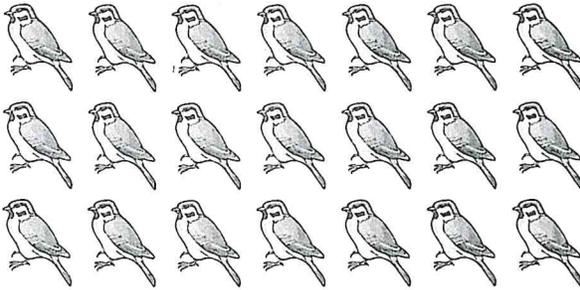
$$\underline{\hspace{2cm}} \div \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$



Lesson Practice • Part 1

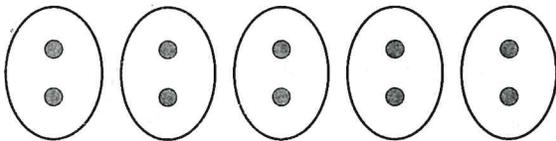
Choose the correct answer.

1. Which division fact does this array show?



- A. $15 \div 3 = 5$
 B. $20 \div 5 = 4$
 C. $21 \div 3 = 7$
 D. $25 \div 5 = 5$

2. Which division fact does this picture show?



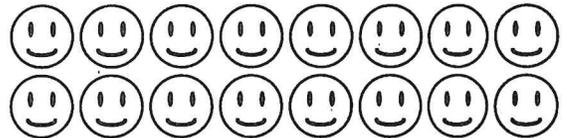
- A. $20 \div 2 = 10$
 B. $10 \div 5 = 2$
 C. $5 \div 5 = 1$
 D. $5 \div 1 = 5$

3. Which number makes this sentence true?

$$16 \div 4 = \square$$

- A. 4
 B. 6
 C. 8
 D. 12

4. Which fact is **not** related to any of the other facts?



- A. $16 \div 2 = 8$
 B. $2 \times 8 = 16$
 C. $8 \times 2 = 16$
 D. $16 \div 4 = 4$

5. Which number makes both sentences true?

$$40 \div \square = 4$$

$$4 \times \square = 40$$

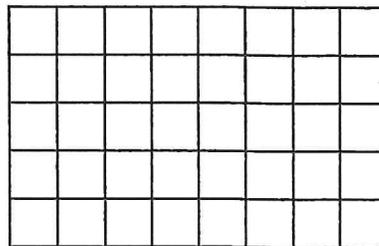
- A. 10
 B. 9
 C. 8
 D. 7

6. Which multiplication fact can be used to find the missing number?

$$36 \div \square = 9$$

- A. $2 \times 18 = 36$
- B. $6 \times 6 = 36$
- C. $9 \times 4 = 36$
- D. $36 \times 1 = 36$

7. Which division fact does this area model show?



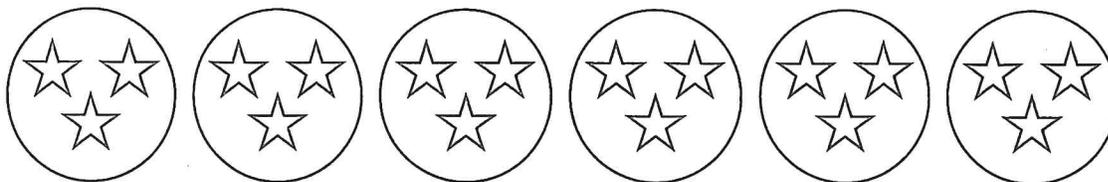
- A. $60 \div 5 = 12$
- B. $50 \div 10 = 5$
- C. $40 \div 4 = 10$
- D. $40 \div 5 = 8$

8. Find the quotient.

$$48 \div 8 = \square$$

- A. 6
- B. 7
- C. 8
- D. 9

9. Dennis drew the picture below.



- A. Write two division facts for the picture.

- B. Write two multiplication facts for the picture.



Lesson Practice • Part 2

Choose the correct answer.

1. Which division fact does this array show?



- A. $24 \div 4 = 6$
 B. $28 \div 4 = 7$
 C. $30 \div 5 = 6$
 D. $36 \div 6 = 6$

2. Which number makes both sentences true?

$$7 \times \square = 28$$

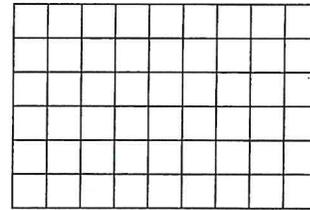
$$28 \div \square = 7$$

- A. 3 C. 5
 B. 4 D. 6

3. What is the least number of facts that a multiplication and division fact family can have?

- A. 4 C. 2
 B. 3 D. 1

4. Which division fact does this area model show?

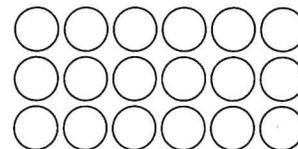


- A. $45 \div 9 = 5$
 B. $48 \div 6 = 8$
 C. $50 \div 5 = 10$
 D. $54 \div 9 = 6$

5. When using repeated subtraction, how many times is 8 subtracted from 40 until 0 is reached?

- A. 4 C. 6
 B. 5 D. 7

6. Which fact is not related to any of the other facts?



- A. $3 \times 6 = 18$
 B. $6 \times 3 = 18$
 C. $18 \div 2 = 9$
 D. $18 \div 6 = 3$

7. What does $12 \div 4$ mean?

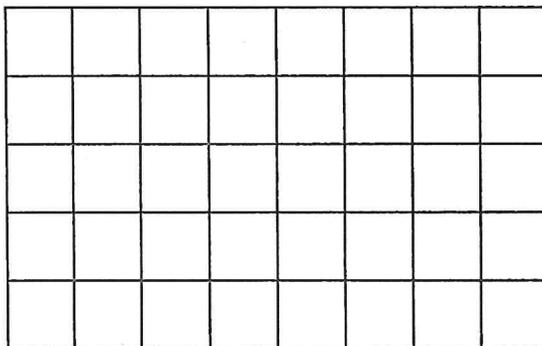
- A. $12 - 4 - 4 - 4 = 0$
- B. $12 - 4 - 4 - 4 - 4 = 0$
- C. $12 - 4 - 4 = 0$
- D. $12 - 4 = 0$

8. Which multiplication fact can be used to find the missing number?

$$42 \div \square = 7$$

- A. $3 \times 14 = 42$
- B. $6 \times 7 = 42$
- C. $21 \times 2 = 42$
- D. $42 \times 1 = 42$

9. Look at the area model.



A. Write two division facts for the area model.

B. Write two multiplication facts for the area model.

C. Explain how fact families are helpful.

Division Facts



Getting the Idea

There are many strategies you can use to solve division problems.

- Use a related division or multiplication fact.
- Use a multiplication table.
- Skip count backward.
- Use repeated subtraction.
- Make a model.

Example 1

Find the quotient.

$$40 \div 8 = \square$$

Strategy Use a related multiplication fact.

Step 1

Look at the numbers in the division problem.

40 and 8

Step 2

Use a related multiplication fact.

Think: $8 \times ? = 40$

$8 \times 5 = 40$

Step 3

Multiplication and division are inverse operations.

So, $40 \div 8 = 5$.

Solution $40 \div 8 = 5$

You can use a multiplication table to help you with basic division facts.

Example 2

Find the quotient.

$$36 \div 9 = \square$$

Strategy Use a multiplication table.

Step 1

Look at the 9s row.

Find 36.

Step 2

From 36, go to the top to find which column it is in.

It is in the 4s column.

The quotient is 4.

\times	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

Solution $36 \div 9 = 4$