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# PRACTICE 1

Parts one and two

## MULTIPLICATION PROPERTIES

### OBJECTIVES

In part one, students will:

- Understand and apply the Commutative Property of Multiplication.
- Use arrays to model multiplication.
- Multiply 1-digit numbers.

In part two, students will:

- Understand and apply the Associative Property of Multiplication.
- Use arrays to model multiplication.
- Multiply 1-digit numbers.

### VOCABULARY

#### Part one

- **multiplication:** an operation used to find the total number of items in equal-sized groups
- **array:** a set of objects or symbols arranged in rows of equal size
- **Commutative Property of Multiplication:** a rule that states you can multiply factors in any order; the product is the same
- **factors:** the numbers you multiply to get a product
- **product:** the result of multiplying numbers together

#### Part two

- **Associative Property of Multiplication:** a rule that states you can change the grouping of 3 or more factors; the product is the same

### AUSTRALIAN CURRICULUM CONTENT DESCRIPTIONS

See page 13 to cross-reference this lesson with aligned Australian Curriculum content descriptions

### RELATED STAMS® PLUS INSTRUCTION

For instruction that supports this practice, go to:



*STAMS® Plus*, Book D, Lesson 1,  
Multiplication properties,  
pp. 4–13

#### *STAMS®* IWB lessons, Level D, Visualise multiplication properties



Use features such as sliding screens with additional practice to deepen students' understanding of the Commutative and Associative Properties of Multiplication.



**Download**

<http://iwb.camsandstams.com.au>


Part one

**PRACTICE**  
**1**  
 Part one

**MULTIPLICATION PROPERTIES**

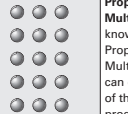
Use the arrays to solve the problem.

1. How are these multiplication facts related?



$3 \times 5 = 15$

factors product






$5 \times 3 = 15$

factors product

**Solution:** If you know  $5 \times 3 = 15$ , then you also know  $3 \times 5 = 15$ .

Solve each problem. Fill in the blanks.

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


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

4. If you know  $8 \times 6 = \underline{48}$ , then you know  $6 \times \underline{8} = \underline{48}$ .

5. Write two multiplication facts using the numbers 7, 8 and 56.  
 $\underline{7} \times \underline{8} = \underline{56}$   
 $\underline{8} \times \underline{7} = \underline{56}$

The Commutative Property of Multiplication is also known as the Order Property of Multiplication. You can change the order of the factors and the product is the same.

Let's solve this together.



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Multiplication properties

Solve each problem. Choose the best answer.

6. What number is missing from this equation?

$8 \times 5 = 5 \times \square$

A 5  
B 8  
C 13  
D 40

7. Which is an example of the Commutative Property of Multiplication?

A  $8 + 9 = 9 + 8$   
B  $8 + 9 = 9 \times 8$   
C  $8 \times 9 = 9 \times 8$   
D  $8 \times 8 = 9 \times 9$

8. If  $7 \times 9 = 63$ , then  $9 \times 7 = \square$ .

A 14  
B 16  
C 56  
D 63


9. Pablo knows that  $6 \times 9 = 54$ . So, he also knows that \_\_\_\_\_.

A  $9 + 6 = 15$   
B  $9 \times 6 = 54$   
C  $6 \times 9 = 69$   
D  $9 \times 6 = 96$


**REASONING**

Solve the problem.

10. Jody has 4 bags of 5 apples. Lance has 5 bags of 4 apples. Who has more apples? Explain. Use pictures, words or numbers to show your work.



$4 \times 5 = 20$



$5 \times 4 = 20$

Jody and Lance each have the same number of apples because \_\_\_\_\_

$4 \times 5 = 20$  and  $5 \times 4 = 20$ . I drew an array for each person to show that each of them has 20 apples.

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At a Glance

Students solve a variety of multiplication problems involving the Commutative Property of Multiplication. If students have difficulty, check for these common pitfalls and use the related tips to provide help.

Solve Problems 2–5

**If** Students who write an incorrect product for problem 4 recalled another fact.

**Then** Encourage students to draw a picture of 6 rows of 8 objects each to model the problem. Ask them to count the total number of objects in the array.

Solve Problems 6–9

**If** If students choose A for problem 7, they may have misread the operation signs in that answer choice.

**Then** Focus on the word *multiplication* in the problem. Then ask students to find the answer choice with an equation that uses a pair of multiplication symbols and the same factors for each expression.

Reasoning, Problem 10

**If** Students who state that either Jody or Lance has more apples do not understand the Commutative Property.

**Then** Ask students to draw an array for the number of apples for each person. Guide students to conclude that both arrays show the same product.


## Part two

**PRACTICE**  
**1**  
 Part two


### MULTIPLICATION PROPERTIES

Use the arrays to solve the problem.

1. How are these multiplication equations related?




$(3 \times 2) \times 4 = \underline{24}$



$3 \times (2 \times 4) = \underline{24}$

Both sets of arrays show 24 objects.  
**Solution:**  $(3 \times 2) \times 4 = 3 \times (2 \times 4)$

The **Associative Property of Multiplication** is also known as the Grouping Property of Multiplication. You can change the grouping of the factors and the product is the same.



Let's solve this together.

**Solve each problem. Fill in the blanks.**

2. Change the grouping of the factors so that you can work with basic facts. Find the product.  
 $(5 \times 3) \times 2 = \underline{5} \times (\underline{3} \times \underline{2})$   
 $= \underline{5} \times \underline{6}$   
 $= \underline{30}$

3. The Associative Property of Multiplication is also called the Grouping Property of Multiplication. If you change the grouping of the factors, the product is still the same.

4. Show a way to group  $(9 \times 2) \times 3$  to find the product using basic facts.  
 $(9 \times 2) \times 3 = \underline{9} \times (\underline{2} \times \underline{3})$   
 $= \underline{9} \times \underline{6}$   
 $= \underline{54}$

5. The Commutative Property of Multiplication is also called the Order Property of Multiplication. If you change the order of the factors, the product is still the same.

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Multiplication properties


**Solve each problem. Choose the best answer.**

6. What number is missing from this equation?  
 $(4 \times 6) \times 5 = 4 \times (\square \times 5)$   
 A 4                      B 6  
 C 5                      D 15

7. Which is an example of the Associative Property of Multiplication?  
 A  $6 \times 3 = 3 \times 6$   
 B  $6 + 3 = 3 + 6$   
 C  $(6 + 3) + 2 = 6 + (3 + 2)$   
 D  $(6 \times 3) \times 2 = 6 \times (3 \times 2)$

8. Which is an example of the Commutative Property of Multiplication?  
 A  $6 \times 3 = 3 \times 6$   
 B  $6 + 3 = 3 + 6$   
 C  $(6 + 3) + 2 = 6 + (3 + 2)$   
 D  $(6 \times 3) \times 2 = 6 \times (3 \times 2)$

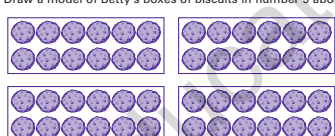
9. Betty has 4 boxes of biscuits. Each box has 2 layers of 6 biscuits. How many biscuits does she have?  
 A 8                      C 24  
 B 12                     D 48



### REASONING

**Solve the problem. Explain your thinking.**

10. Draw a model of Betty's boxes of biscuits in number 9 above.



Fill in the numbers.  $4 \times (2 \times \underline{6}) = (\underline{4} \times \underline{2}) \times \underline{6} = \underline{48}$

Why do you think it is easier and faster to find  $(4 \times 2) \times 6$  than it is to find  $4 \times (2 \times 6)$ ?  
 $(4 \times 2) \times 6 = 8 \times 6$ .  $8 \times 6 = 48$  is a basic fact I already know.  
 But  $4 \times (2 \times 6) = 4 \times 12$  which is not a basic fact, and I may have to calculate the product.

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## At a Glance

Students solve a variety of multiplication problems involving the Associative Property of Multiplication. If students have difficulty, check for these common pitfalls and use the related tips to provide help.

### Solve Problems 2–5

**If** If students write incorrect answers for problem 5, they may have forgotten the definition of the Commutative Property of Multiplication.

**Then** Review the Commutative Property of Multiplication and the word *order*.

### Solve Problems 6–9

**If** Students who choose D for problem 6 may have added the numbers 4, 6 and 5 on the left side of the equation.

**Then** Clarify that one side of an equation doesn't always show a sum or product, but may show a different grouping of terms.

### Reasoning, Problem 10

**If** If students cannot draw a model for the problem, they may not have fully understood the context in problem 9.

**Then** Have students re-read problem 9 slowly. Ask them guiding questions, such as: "Can you draw 4 boxes? What are you going to put in each box?" Then help students articulate their thinking.

### OBJECTIVES

In review 1, students will:

- Use basic facts and patterns to mentally multiply 1-digit numbers by multiples of 10.
- Use mental maths to multiply multiples of 10 by multiples of 10.
- Use a quicker algorithm for recording the partial products when multiplying a 2-digit number by a 1-digit number.
- Use a quicker algorithm for recording the partial products when multiplying two 2-digit numbers.
- Regroup ones as tens and tens as hundreds.

In review 2, students will:

- Understand and apply the Commutative and Associative Properties of Multiplication.
- Use mental maths to multiply 1-digit numbers and multiples of 10 by multiples of 10.
- Use quicker algorithms to multiply 2-digit numbers by 1- and 2-digit numbers.

### VOCABULARY

Review 1

- **multiplication:** an operation used to find the total number of items in equal-sized groups

Review 2

- **Commutative Property of Multiplication:** a rule that states you can multiply factors in any order; the product is the same
- **Associative Property of Multiplication:** a rule that states you can change the grouping of 3 or more factors; the product is the same
- **factors:** the numbers you multiply to get a product
- **product:** the result of multiplying numbers together

### AUSTRALIAN CURRICULUM CONTENT DESCRIPTIONS

See page 13 to cross-reference this lesson with aligned Australian Curriculum content descriptions

# Review 1

**REVIEW**  
1

**REVIEW 1: PRACTICES 1 AND 2**

Solve each problem. Choose the best answer.

1. Which makes the sentence true?  
 $70 \times \square = 6300$

Ⓐ 9  
 ● 90  
 Ⓒ 900  
 Ⓓ 9000

2.  $96 \times 7$

Ⓐ 622  
 ● 672  
 Ⓒ 722  
 Ⓓ 742

3. One minibus can carry 12 students. How many students can 15 minibuses carry?

Ⓐ 45  
 Ⓑ 150  
 ● 180  
 Ⓓ 540

4. Kayla bought 3 bags of buttons. There were 200 buttons in each bag. How many buttons did she buy in all?

Ⓐ 203  
 ● 600  
 Ⓒ 3200  
 Ⓓ 6000

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Review 1: Practices 1 and 2

**MENTAL MATHS**

Match the multiplication problem with the correct answer. Solve as many problems as you can using mental maths. Then solve the rest on paper. Show your work.

5.  $9 \times 32$

B Student shows work.

$$\begin{array}{r} 1 \\ 32 \\ \times 9 \\ \hline 288 \end{array}$$

6.  $90 \times 30$

D

7.  $58 \times 39$

F Student shows work.

$$\begin{array}{r} 2 \\ 58 \\ \times 39 \\ \hline 522 \\ + 1740 \\ \hline 2262 \end{array}$$

8.  $7 \times 400$

E

9.  $8 \times 35$

A Student shows work.

$$\begin{array}{r} 4 \\ 35 \\ \times 8 \\ \hline 280 \end{array}$$

10.  $60 \times 43$

C

$$\begin{array}{r} 60 \\ \times 43 \\ \hline 180 \\ + 2400 \\ \hline 2580 \end{array}$$

A 280  
 B 288  
 C 2580  
 D 2700  
 E 2800  
 F 2262

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## At a Glance

Students solve a variety of multiplication problems by using mental maths and multiplication algorithms. If students have difficulty, check for these common pitfalls and use the related tips to provide help.

### Solve Problems 1–4

**If** If students choose A, C or D for problem 2, they may not fully recall the steps involved to multiply a 2-digit number by a 1-digit number.

**Then** Review the multiplication algorithm in Practice 3 part two with students. Remind students to include the regrouped 4 tens in the final answer. If students are still struggling, have them use the partial products method shown in Practice 3 part one.

### Mental Maths, Problems 5–10

**If** If students choose incorrect answers for problems 8 and 9, they may have forgotten the importance of place value in the multiplication process.

**Then** Review with students how to multiply with multiples of 10 (Practice 2) and how to multiply a 2-digit number by a 1-digit number (Practice 3). Emphasise the importance of place value in both methods.