



TABE Math-E

PAXEN

Unit-3 Multiply and Divide Whole Numbers

Lesson 16 Multiplication With Commutative and Associative Property

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Some graphics may not have copied well during the scan process.

Math-E - Lesson 16 – Commutative

The Commutative Property of Multiplication states that the order of the factors in a multiplication problem does not change the product of the two numbers.

$$3 \times 4 = 12$$

$$4 \times 3 = 12$$

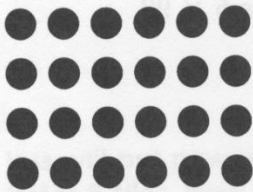
The Associative Property of Multiplication states that the grouping of factors in a multiplication problem does not change the product of those factors.

$$(5 \times 4) \times 2 = 20 \times 2 = 40$$

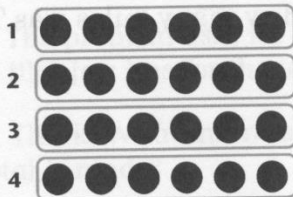
$$5 \times (4 \times 2) = 5 \times 8 = 40$$

You can use the Commutative and Associative Properties of Multiplication to help solve multiplication problems.

Example How many dots are in the array?
Write two multiplication equations to find the total.



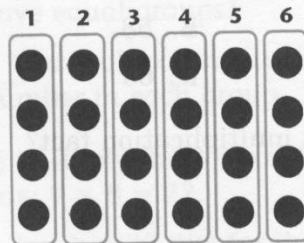
1) Think of the problem as an equal groups problem.



There are 4 equal groups of 6.

You can multiply $4 \times 6 = 24$.

2) Reverse the order of the factors.



There are 6 equal groups of 4.

You can multiply $6 \times 4 = 24$.

4×6 is the same as 6×4 .

Example Solve: $(3 \times 4) \times 5 = \underline{\hspace{2cm}}$

1) Restate the problem to use benchmark facts.

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

2) Find the product of the second and third factors.

$$3 \times (4 \times 5) = 3 \times 20$$

3) Multiply the product by the first factor.

$$3 \times 20 = 60$$

Math-E - Lesson 16 – Commutative

Test Example

1. Solve: $7 \times 2 \times 3 =$ _____
- A. 17 B. 27
C. 37 D. 42

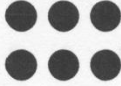
1. D $2 \times 3 = 6$. $7 \times 6 = 42$.

Hint

First, multiply the two factors that make the smallest product. Then multiply the product by the third factor.

Practice

Read each question. Select the correct answer.

- 1 What is $9 \times 2 \times 3$?
- A. 63 B. 54
C. 21 D. 15
- 2 Isabella multiplied 8×3 . Trey multiplied 3×8 . They both got a product of 24. Who is correct?
- A. Isabella is correct because $8 \times 3 = 24$.
B. Trey is correct because $3 \times 8 = 24$.
C. Isabella and Trey are both correct because when the order of the two factors is reversed, the product remains the same.
D. Neither Isabella nor Trey is correct.
- 3 Which multiplication problem does **NOT** have a product of 40?
- A. 5×8 B. $5 \times 4 \times 2$
C. 8×5 D. $8 \times 2 \times 5$
- 4 What is $4 \times 3 \times 4$?
- A. 48 B. 16
C. 12 D. 11
- 5 What is $5 \times 3 \times 6$? Which answer shows how to find the product?
- A. 90; Multiply 5×6 . Then multiply 30×3 .
B. 180; Multiply 5×3 . Then multiply 30×6 .
C. 18; Multiply 3×6 . Then multiply 6×3 .
D. 75; Multiply 3×5 . Then multiply 15×5 .
- 6 Leah writes a multiplication equation to find the total dots in the array.
- 
- First, she writes 3×2 . What other multiplication equation could she write to represent the array?
- A. 3×6 B. 2×3
C. 2×6 D. 6×3
- 7 What is $10 \times 2 \times 4$?
- A. 20 B. 40
C. 80 D. 100
- 8 Kaden wants to multiply $4 \times 5 \times 4$. First, he multiplies 4×5 . What should his next step be?
- A. Multiply 5×4 .
B. Multiply 4×4 .
C. Multiply 20×4 .
D. Multiply 20×5 .
- 9 What is $6 \times 5 \times 2$?
- A. 30 B. 60
C. 70 D. 100
- 10 Which multiplication problems have a product of 80? Select the two that apply.
- A. $3 \times 10 \times 3$ B. $4 \times 2 \times 10$
C. $5 \times 4 \times 4$ D. $8 \times 2 \times 3$

Math-E - Lesson 16 – Commutative

Lesson 16

Commutative and Associative Properties of Multiplication

(3.OA.5)

1. B. The product of 3×2 is 6. The product of 6×9 is 54.
2. C. Isabella and Trey are both correct because when the order of the two factors is reversed, the product remains the same.
3. D. The product of 2×5 is 10. The product of 10×8 is 80.
4. A. Multiply 4 and 3 to get 12. Multiply 12 by 4 to get 48.
5. A. The product of 5×6 is 30. The product of 30×3 is 90.
6. B. The order of the factors can be reversed without changing the product.
7. C. The product of 10×4 is 40. The product of 40×2 is 80.
8. C. After Kaden multiplies the first two factors, he must multiply that product by the last factor.
9. B. The product of 6×5 is 30. The product of 30×2 is 60.
10. B, C. The product of 4×2 is 8. The product of 8×10 is 80. The product of 5×4 is 20. The product of 20×4 is 80.

Math-E - Practice 16 - Commutative

- 1 What is $8 \times 5 \times 3$?
- A. 130 B. 120
C. 64 D. 16
- 2 Aiko makes \$20 an hour at her job. She works eight-hour days and earns \$160 per day. Which two multiplication problems can be used to calculate how much Aiko earns per day?
- A. 8×20
B. 160×8
C. 20×160
D. 20×8
E. 8×160
F. 160×20
- 3 Which multiplication problem does **NOT** have a product of 60?
- A. 10×6 B. $(5 \times 2) \times 6$
C. 6×10 D. $5 \times 6 \times 3$

Use the information to answer question 4.

On Friday, Lonnie dispatches three delivery trucks. Each truck holds eight sets of tires. Each set consists of four tires.

- 4 **Part A**
- Which two multiplication problems can be used to determine how many tires are out for delivery?
- A. $(3 \times 8) \times 4$
B. $(5 \times 8) \times 4$
C. $3 \times (3 \times 8)$
D. $3 \times (4 \times 8)$
E. $3 \times 4 \times 4$
F. $(8 \times 4) \times 5$
- Part B**
- How many tires are out for delivery?
- A. 72 tires B. 96 tires
C. 108 tires D. 124 tires

Use the information to answer question 5.

Tamara and Tushar are delivery drivers. They drive separate trucks to deliver basketballs to a sports arena. Nine boxes fit in each truck. Eight basketballs fit in each box.

- 5 **Part A**
- Which multiplication problem can be used to find the total number of basketballs Tamara and Tushar deliver to the sports arena?
- A. $2 \times 9 \times 8$ B. 9×8
C. $4 \times 9 \times 8$ D. 2×8
- Part B**
- How many basketballs do Tamara and Tushar deliver to the sports arena?
- A. 134 basketballs
B. 144 basketballs
C. 160 basketballs
D. 172 basketballs

- 6 When Shandra turned 65, her friends gave her a gift certificate for yoga classes. She uses the gift certificate to attend five yoga classes. Each class lasts 60 minutes. Shandra multiplies 5×60 to get 300. Which is another multiplication problem Shandra can use to find the number of minutes she spends in yoga classes?
- A. 60×5 B. 20×5
C. 30×6 D. 60×6

- 7 What is $4 \times 7 \times 3$? Which answer shows how to find the product?
- A. 28; Multiply 4×7 . Then multiply 7×4 .
B. 49; Multiply 4×7 . Then multiply 7×3 .
C. 84; Multiply 7×3 . Then multiply 21×4 .
D. 112; Multiply 4×7 . Then multiply 28×4 .

Math-E - Practice 16 - Commutative

Use the information to answer question 8.

Munni's Bakery receives a cake order for a party. The customer plans to have six tables with four mini cakes per table. After Munni bakes the cakes, the customer tells him they only have four tables. However, they still want the same number of cakes and an equal number of cakes on each table.

8

Part A

How many cakes does Munni have to bake?

- A. 8 cakes
- B. 16 cakes
- C. 24 cakes
- D. 36 cakes

Part B

How many cakes will go on each table?

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

9

Monique buys five boxes of bagels for a company breakfast. Each box has 12 bagels in it. She places a plate of bagels on 12 tables. Each plate has the same number of bagels. How many bagels are on each plate?

- A. 5 bagels
- B. 8 bagels
- C. 9 bagels
- D. 12 bagels

10

What is $2 \times 6 \times 3$?

- A. 11
- B. 18
- C. 36
- D. 48

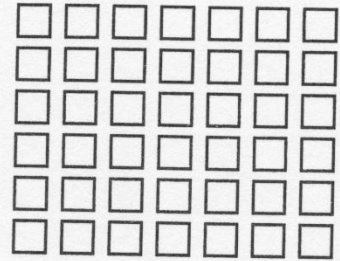
11

Haley makes \$9 an hour and works 10 hours a day. Chantel makes \$10 an hour and works 9 hours a day. Luca makes \$9 an hour and works two 5-hour shifts a day. Which statement is true?

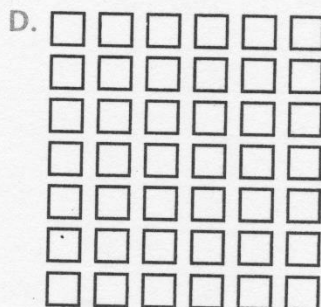
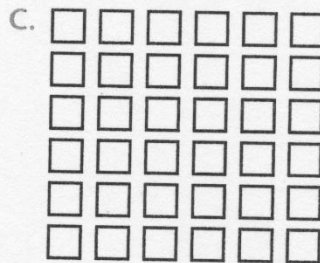
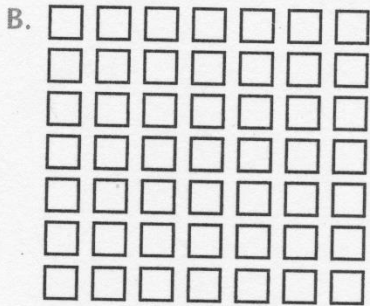
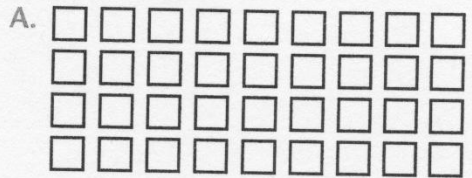
- A. Haley makes more money each day than Chantel and Luca.
- B. Chantel makes more money each day than Luca and Haley.
- C. Luca makes more money each day than Chantel and Haley.
- D. Haley, Chantel, and Luca make the same amount of money each day.

12

Kachina is arranging chairs for a seminar. She arranges the chairs in an array.



What is another way Kachina could arrange the chairs to seat the same number of people?



Math-E - Practice 16 – Commutative

Practice 16

Commutative and Associative Properties of Multiplication

pp. 36–37

3.OA.5

- 1. B.** Group the factors: $(8 \times 5) \times 3$. The product of 8×5 is 40. The product of 40×3 is 120.
- 2. A, D.** $20 \times 8 = 160$ and $8 \times 20 = 160$. When the order of the two factors is reversed, the product remains the same.
- 3. D.** The product of 5×6 is 30. The product of 30×3 is 90.
- 4. Part A: A, D.** There are 3 trucks each with 8 sets of 4 tires out for delivery. Multiply to find the total. The problem can be written as $(3 \times 8) \times 4$ or $3 \times (8 \times 4)$.
Part B: B. The product of 3×8 is 24. The product of 24×4 is 96. So, 96 tires are out for delivery.
- 5. Part A: A.** There are 2 trucks each with 9 boxes and 8 basketballs per box. Multiply to find the total. The problem can be written as $2 \times 9 \times 8$.
Part B: B. Group the factors: $(8 \times 9) \times 2$. The product of 8×9 is 72. The product of 72×2 is 144. Tamara and Tushar deliver 144 basketballs to the sports arena.
- 6. A.** $5 \times 60 = 300$ and $60 \times 5 = 300$. Shandra can multiply 60×5 to determine the number of minutes she spends in 5 classes.
- 7. C.** Group the factors: $4 \times (7 \times 3)$. The product of 7×3 is 21. The product of 21×4 is 84.
- 8. Part A: C.** $4 \times 6 = 24$; Munni has to bake 24 cakes.
Part B: B. $6 \times 4 = 24$ and $4 \times 6 = 24$. There are four tables, so six cakes will go on each table.
- 9. A.** $12 \times 5 = 60$ and $5 \times 12 = 60$. Monique places 5 bagels on each plate.
- 10. C.** The product of 2×6 is 12. The product of 12×3 is 36.
- 11. D.** Haley makes $\$9 \times 10 = \90 . Chantel makes $\$10 \times 9 = \90 . Luca makes $\$9 \times (2 \times 5) = \$9 \times 10 = \$90$. They make the same amount each day.
- 12. D.** There are 6 equal groups of 7 chairs: 6×7 . There are 7 equal groups of 6 chairs: 7×6 . According to the Commutative Property, the order of the factors does not change the product: $6 \times 7 = 7 \times 6$.