

Understanding the Relationship Between Multiplication and Division

 Grade 3

 Operations & Algebraic Thinking (OA)

 15 minutes

 20 Questions

Common Core Standards:

3.OA.A.4: Determine the unknown whole number in a multiplication or division equation

3.OA.B.6: Understand division as an unknown-factor problem

3.OA.C.7: Fluently multiply and divide within 100

Name: _____

Date: _____

Score: _____ / 20

Understanding How Multiplication and Division Work Together

What Are Inverse Operations?

Multiplication and division are called "inverse operations" because they undo each other.

- If you multiply a number by something, you can divide to get back to the original number
- If you divide a number by something, you can multiply to get back to the original number

The Relationship Rule:

- If $a \times b = c$, then $a = c/b$ and $b = c/a$
- Example: $3 \times 8 = 24$, so $3 = 24/8$ and $8 = 24/3$

Using Models to Show Operations:

When you group items (like cherries on plates), you can use multiplication:

- 6 plates with 9 cherries each = $6 \times 9 = 54$ cherries
- You can break this into smaller groups: $(4 \text{ plates} + 2 \text{ plates}) \times 9 \text{ cherries} = (4 + 2) \times 9$

KEY TAKEAWAY:

The number of cherries on EACH plate stays the same. You add the number of PLATES, not the cherries!

Testing If a Number Works:

To check if a number makes an equation true, substitute it in and solve:

- Does 8 work in $36 \div ? = 6$?
- Try it: $36 \div 8 = 4.5$ (not 6!)
- So the answer is NO, 8 does not work
- What does work? $36 \div 6 = 6$ ✓

Worked Examples

Study these examples carefully before starting the practice questions.

Example 1

Problem: What value makes both equations true? $20 \div 4 = ?$ and $4 \times ? = 20$

Division and multiplication are inverse operations. Since $20 \div 4 = 5$, we know that $4 \times 5 = 20$.

Answer:

Example 2

Problem: Maria has 5 bags. She puts 7 candies in each bag. She finds the total using $(3 + 2) \times 7$. Why does this work?

When grouping, you add the number of GROUPS (bags), then multiply by what's in EACH group (candies per bag).

Answer:

Example 3

Problem: Does putting 7 in the box make this equation true? $42 \div ? = 6$

Always substitute the number and calculate. If both sides equal the same value, it's true.

Answer:

Practice Questions

Solve each problem. Show your work in the space provided.

1. What value makes both equations true? $24 \div 3 = ?$ and $3 \times ? = 24$
A) 6 B) 8 C) 7 D) 9

2. What value makes both equations true? $35 \div 5 = ?$ and $5 \times ? = 35$
A) 8 B) 7 C) 5 D) 9

3. What value makes both equations true? $48 \div 6 = ?$ and $6 \times ? = 48$
A) 8 B) 6 C) 7 D) 10

4. What value makes both equations true? $54 \div 9 = ?$ and $9 \times ? = 54$
A) 5 B) 8 C) 6 D) 4

5. Lyle has 6 plates. He puts 9 cherries on each plate. He finds the total number of cherries by splitting the plates into 4 and 2. Which expression shows this?
A) $(4 + 2) \times 9$ B) $(9 + 6) \times 2$ C) $(4 + 9) \times (2 + 9)$

6. Amy has 7 boxes. She puts 8 toys on each box. She finds the total number of toys by splitting the boxes into 3 and 4. Which expression shows this?
A) $(3 + 4) \times 8$ B) $(3 + 8) \times (4 + 8)$ C) $(8 + 7) \times 4$

7. Tom has 5 bags. He puts 6 apples on each bag. He finds the total number of apples by splitting the bags into 2 and 3. Which expression shows this?
A) $(2 + 6) \times (3 + 6)$ B) $(6 + 5) \times 3$ C) $(2 + 3) \times 6$

8. Sarah has 8 trays. She puts 5 cookies on each tray. She finds the total number of cookies by splitting the trays into 5 and 3. Which expression shows this?
A) $(5 + 8) \times 3$ B) $(5 + 3) \times 5$ C) $(5 + 5) \times (3 + 5)$

9. Decide if putting the number 8 in the box makes the equation true: $36 \div ? = 6$
A) Yes B) No

10. Decide if putting the number 6 in the box makes the equation true: $42 \div ? = 7$
A) Yes B) No

11. Decide if putting the number 7 in the box makes the equation true: $56 \div ? = 8$
A) Yes B) No

12. Decide if putting the number 8 in the box makes the equation true: $45 \div ? = 5$
A) Yes B) No

13. What number goes in the box? $7 \times ? = 42$

14. What number goes in the box? $8 \times ? = 56$

15. What number goes in the box? $9 \times ? = 63$

16. What number goes in the box? $6 \times ? = 48$

17. What number goes in the box? $32 \div ? = 8$

18. What number goes in the box? $49 \div ? = 7$

19. What number goes in the box? $30 \div ? = 5$

20. What number goes in the box? $28 \div ? = 4$
