

Checking Multiplication Using Even & Odd Patterns



Grade 3



Operations & Algebraic Thinking (OA)



15 minutes



23 Questions

Common Core Standards:

3.OA.A.1: Interpret products of whole numbers

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

3.OA.D.9: Identify arithmetic patterns

Name: _____

Date: _____

Score: _____ / 23



Using Even & Odd Patterns to Check Your Work

Did you know you can check if a multiplication answer MIGHT be correct without doing all the math? You can use even and odd number patterns!

First, remember: EVEN numbers end in 0, 2, 4, 6, or 8. ODD numbers end in 1, 3, 5, 7, or 9.

Here are the magic rules for multiplying even and odd numbers:

- Even $\times$ Even = Even (example: $4 \times 6 = 24$, both even, answer is even)
- Even $\times$ Odd = Even (example: $4 \times 3 = 12$, one even, answer is even)
- Odd $\times$ Even = Even (example: $3 \times 6 = 18$, one even, answer is even)
- Odd $\times$ Odd = Odd (example: $3 \times 5 = 15$, both odd, answer is odd)

★ KEY TAKEAWAYS:

- Notice the pattern: If at least ONE number is even, the answer MUST be even.
- Only when BOTH numbers are odd will the answer be odd!

This helps you catch mistakes! If you multiply 4×6 and get 23, you know something is wrong because 4 and 6 are both even, so the answer must be even, not odd like 23!

Worked Examples

Study these examples carefully before starting the practice questions.

Example 1

Problem: Is this answer possible? $6 \times 7 = 43$

$$6 \text{ (even)} \times 7 \text{ (odd)} = 43 \text{ (odd)} \text{ ?}$$

Use even/odd rules to check

1. Step 1: Check if 6 is even or odd $\rightarrow$ 6 ends in 6, so it's EVEN
2. Step 2: Check if 7 is even or odd $\rightarrow$ 7 ends in 7, so it's ODD
3. Step 3: Apply the rule $\rightarrow$ Even $\times$ Odd = EVEN
4. Step 4: Check the answer $\rightarrow$ 43 ends in 3, so it's ODD
5. Step 5: Compare $\rightarrow$ The answer should be EVEN but 43 is ODD
6. Conclusion: This answer is IMPOSSIBLE! There's a mistake.

Answer: No, impossible. Even $\times$ Odd must be Even, but 43 is Odd.

Example 2

Problem: Is this answer possible? $5 \times 9 = 45$

$$5 \text{ (odd)} \times 9 \text{ (odd)} = 45 \text{ (odd)} \checkmark$$

Check if the even/odd pattern matches

1. Step 1: Check if 5 is even or odd $\rightarrow$ 5 ends in 5, so it's ODD
2. Step 2: Check if 9 is even or odd $\rightarrow$ 9 ends in 9, so it's ODD
3. Step 3: Apply the rule $\rightarrow$ Odd $\times$ Odd = ODD
4. Step 4: Check the answer $\rightarrow$ 45 ends in 5, so it's ODD
5. Step 5: Compare $\rightarrow$ The answer should be ODD and 45 is ODD
6. Conclusion: This answer MIGHT be correct! (Could still be wrong, but it's possible)

Answer: Yes, possible. Odd $\times$ Odd = Odd, and 45 is Odd. (In fact, this is the correct answer!)

Example 3

Problem: Someone says $8 \times 3 = 25$. Use even/odd checking to see if this could be right.

$$8 \text{ (even)} \times 3 \text{ (odd)} = 25 \text{ (odd)} \times$$

Find the mistake using patterns

1. Step 1: Is 8 even or odd? $\rightarrow$ 8 is EVEN
2. Step 2: Is 3 even or odd? $\rightarrow$ 3 is ODD
3. Step 3: What should the answer be? $\rightarrow$ Even $\times$ Odd = EVEN
4. Step 4: Is 25 even or odd? $\rightarrow$ 25 ends in 5, so it's ODD
5. Step 5: Does it match? $\rightarrow$ NO! The answer should be even but 25 is odd
6. Conclusion: The answer 25 is definitely WRONG!
7. Note: The correct answer is $8 \times 3 = 24$, which is even $\checkmark$

Answer: No, this is wrong. 8×3 must be even, but 25 is odd. The right answer is 24.

Practice Questions

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

1. Is 42 even or odd?

2. Is 37 even or odd?

3. Is 15 even or odd?

4. Which number is odd?

A) 37 B) 90 C) 42 D) 68

5. Which number is even?

A) 93 B) 100 C) 25 D) 77

6. Which number is odd?

A) 32 B) 81 C) 46 D) 58

7. Without solving, tell if the answer will be even or odd: 7×3

8. Without solving, tell if the answer will be even or odd: 5×5

9. Without solving, tell if the answer will be even or odd: 4×5

10. Without solving, tell if the answer will be even or odd: 8×6

11. What will 3×3 be?

A) Even B) Could be either C) Odd D) Cannot be determined

12. What will 5×9 be?

A) Could be either B) Even C) Cannot be determined D) Odd

13. What will 6×7 be?

A) Odd B) Cannot be determined C) Even D) Could be either

14. Is this answer possible? $8 \times 9 = 72$ (Answer Yes or No, and explain why)

15. Is this answer possible? $4 \times 6 = 24$ (Answer Yes or No, and explain why)

16. Is this answer possible? $6 \times 7 = 43$ (Answer Yes or No, and explain why)

17. Is this answer possible? $5 \times 9 = 44$ (Answer Yes or No, and explain why)

18. Which answer could be correct for 4×7 ?

A) 31 B) 28 C) 29 D) 27

19. Which answer could be correct for 5×9 ?

A) 45 B) 46 C) 48 D) 44

20. Which answer could be correct for 6×8 ?

A) 47 B) 48 C) 51 D) 49

21. Which answer is definitely WRONG based on even/odd checking?

A) $9 \times 9 = 80$ B) $6 \times 6 = 36$

22. Which answer is definitely WRONG based on even/odd checking?

A) $7 \times 3 = 20$ B) $4 \times 5 = 20$

23. Which answer is definitely WRONG based on even/odd checking?

A) $8 \times 3 = 25$ B) $8 \times 3 = 24$