

Even & Odd Patterns with LARGE Numbers



Grade 3



Operations & Algebraic Thinking (OA)



15 minutes



20 Questions

Common Core Standards:

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

3.OA.D.9: Identify arithmetic patterns

3.NBT.A.3: Multiply one-digit whole numbers by multiples of 10

Name: _____

Date: _____

Score: _____ / 20

You DON'T Need to Multiply!

The BEST part about even and odd patterns? They work with ANY numbers - even HUGE ones!

You can check if $847 \times 926 = 784,322$ is correct WITHOUT doing the multiplication!

Remember the Even & Odd Rules:

- Even $\times$ Even = Even (The answer MUST be even)
- Even $\times$ Odd = Even (The answer MUST be even)
- Odd $\times$ Even = Even (The answer MUST be even)
- Odd $\times$ Odd = Odd (The answer MUST be 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!

How to Check BIG Numbers:

- Only look at the LAST DIGIT to tell if a number is even or odd
- 847 ends in 7 (odd), so 847 is ODD
- 926 ends in 6 (even), so 926 is EVEN
- Odd $\times$ Even = Even, so the answer MUST end in an even digit (0, 2, 4, 6, or 8)
- 784,322 ends in 2 (even) ✓ This could be correct!

DON'T multiply the big numbers - just check the pattern!

Worked Examples

Study these examples carefully before starting the practice questions.

Example 1

Problem: Is this answer possible? $348 \times 527 = 183,396$

We DON'T multiply! Just check: 348 ends in 8 (even), 527 ends in 7 (odd). Even $\times$ Odd = Even. The answer 183,396 ends in 6 (even). $\checkmark$ This COULD be correct!

1. Look at last digit of 348: it's 8, so 348 is EVEN
2. Look at last digit of 527: it's 7, so 527 is ODD
3. Even $\times$ Odd = EVEN (rule)
4. Check answer: 183,396 ends in 6, which is EVEN $\checkmark$

Answer: Yes, this could be correct! (Even $\times$ Odd = Even)

Example 2

Problem: Is this answer possible? $825 \times 493 = 406,826$

Check the pattern: 825 ends in 5 (odd), 493 ends in 3 (odd). Odd $\times$ Odd = Odd. But 406,826 ends in 6 (even). $\times$ This is DEFINITELY WRONG!

1. Look at last digit of 825: it's 5, so 825 is ODD
2. Look at last digit of 493: it's 3, so 493 is ODD
3. Odd $\times$ Odd = ODD (rule)
4. Check answer: 406,826 ends in 6, which is EVEN $\times$

Answer: No, this is definitely wrong! (Odd $\times$ Odd must be Odd, not Even)

Example 3

Problem: Is this answer possible? $6,842 \times 5,719 = 39,127,198$

Even with REALLY big numbers: 6,842 ends in 2 (even), 5,719 ends in 9 (odd). Even $\times$ Odd = Even. 39,127,198 ends in 8 (even). $\checkmark$ This passes the check!

1. Last digit of 6,842 is 2 $\rightarrow$ EVEN
2. Last digit of 5,719 is 9 $\rightarrow$ ODD
3. Even $\times$ Odd = EVEN
4. 39,127,198 ends in 8 $\rightarrow$ EVEN $\checkmark$

Answer: Yes, this could be correct! (Even $\times$ Odd = Even)

Practice Questions

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

1. Is 12,483 even or odd? (Hint: Look at the last digit!)

2. Is 1,847 even or odd? (Hint: Look at the last digit!)

3. Is 5,926 even or odd? (Hint: Look at the last digit!)

4. Is 8,750 even or odd? (Hint: Look at the last digit!)

5. Is 23,491 even or odd? (Hint: Look at the last digit!)

6. What will $1,642 \times 3,891$ be: Even or Odd?

A) Even B) Odd

7. What will 348×527 be: Even or Odd?

A) Even B) Odd

8. What will $9,263 \times 7,185$ be: Even or Odd?

A) Even B) Odd

9. What will 825×493 be: Even or Odd?

A) Even B) Odd

10. What will $5,777 \times 8,444$ be: Even or Odd?

A) Even B) Odd

11. Is this answer possible? $246 \times 357 = 87,842$

12. Is this answer possible? $1,428 \times 2,650 = 3,784,200$

13. Is this answer possible? $9,999 \times 7,777 = 77,762,226$

14. Is this answer possible? $835 \times 729 = 608,715$

15. Is this answer possible? $5,318 \times 4,927 = 26,202,087$

16. Is this answer possible? $6,245 \times 3,817 = 23,836,564$

17. Is this answer possible? $847 \times 926 = 784,321$

18. Which answer is IMPOSSIBLE based on even/odd rules?

Problem: 576×834

A) 480,384 B) 480,385 C) 480,386 D) 480,388

19. Which answer is IMPOSSIBLE based on even/odd rules?

Problem: $8,624 \times 5,931$

A) 51,149,142 B) 51,149,144 C) 51,149,145 D) 51,149,146

20. Which answer is IMPOSSIBLE based on even/odd rules?

Problem: $1,247 \times 3,851$

A) 4,801,496 B) 4,801,497 C) 4,801,498 D) 4,801,499