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Odd and Even Numbers - Year 4

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ODD AND EVEN NUMBER PATTERNS

PAIR IT UP!

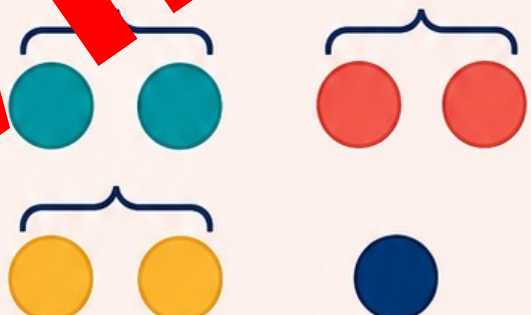
EVEN

Every object has a partner.



ODD

One object is left over.



CHECK THE LAST DIGIT

ODD: 1 3 5 7 9

EVEN: 0 2 4 6 8

PREDICT BEFORE YOU CALCULATE

Addition and subtraction

+ same parity → even

- different parity → odd

Multiplication

× odd × odd → odd

× any even factor → even

ODD & EVEN NUMBER DETECTIVE



CHECK THE LAST DIGIT

ODD: 1 3 5 7 9

EVEN: 0 2 4 6 8



PAIR IT UP

EVEN: no leftovers

ODD: one leftover



OPERATION CLUES

same parity + or - → even

different parity + or - → odd

odd × odd → odd

any even factor → even



ODD & EVEN NUMBER DETECTIVE



CHECK THE LAST DIGIT

ODD: 1 3 5 7 9

EVEN: 0 2 4 6 8



PAIR IT UP

EVEN: no leftovers

ODD: one leftover



OPERATION CLUES

same parity + or - → even

different parity + or - → odd

odd × odd → odd

any even factor → even



PAIR IT UP!

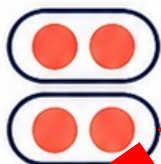
Odd and Even Sorting Mat



Cut out the cards. Solve each expression if needed.
Place every card on the correct side.
Explain how you know.

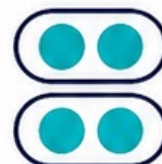
ODD

one unpaired



EVEN

all paired



PREVIEW

PAIR IT UP! CARDS

Cut along the dashed lines.

17

42

305

718

1,009

2,460

$33 + 18$

$64 - 28$

7×5

6×8

$91 + 27$

$150 - 63$

9×9

12×7

$403 + 210$

$700 - 252$

5×14

11×13

888

999

ROLL, BUILD & PROVE



Odd and Even Numbers Game

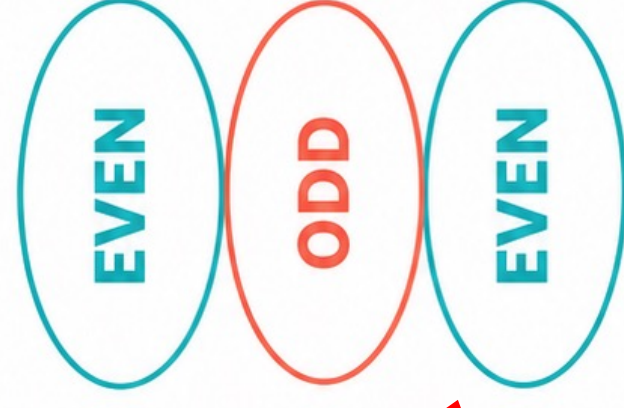
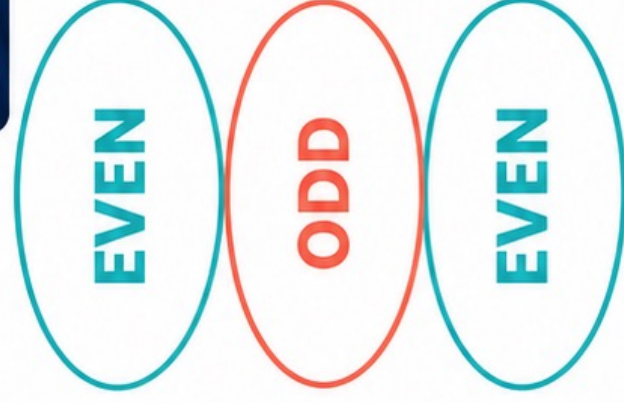
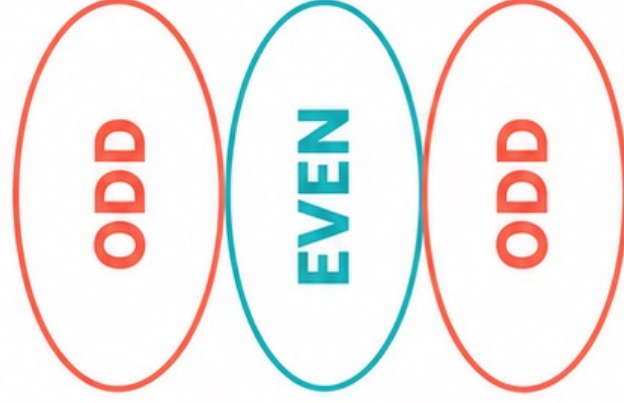
YOU NEED

2 dice, counters,
pencil and paper

HOW TO PLAY

1. Roll two dice, arrange the digits to make a 2-digit number.
2. Roll again to make a second 2-digit number.
3. Choose $+$ or $-$. For subtraction, subtract the smaller number from the larger number.
4. Predict whether the answer will be odd or even.
5. Calculate to prove it. The correct answer covers one matching target.
6. First player to cover four targets wins.

TARGET BOARD





PARITY PATH CHALLENGE

Odd and Even Numbers Game



YOU NEED



1 die and a counter
for each player

HOW TO PLAY

- Roll, move and solve the number or expression you land on.
- Say whether the answer is odd or even.
- Correct? Stay. Not correct? Move back one space.
- First player to reach FINISH wins!



PAIRING AND LEFTOVERS

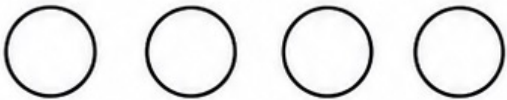
Worksheet 1 • Page 1

Name: _____

Date: _____

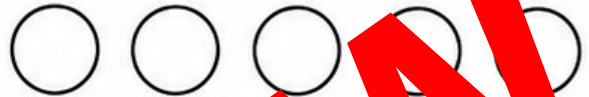
Draw a loop around each pair. Then circle ODD or EVEN.

1.



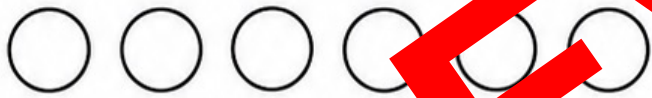
ODD EVEN

2.



ODD EVEN

3.



ODD EVEN

4.



ODD EVEN

5.



ODD EVEN

6.



ODD EVEN

What do you notice about even groups?

PAIRING AND LEFTOVERS

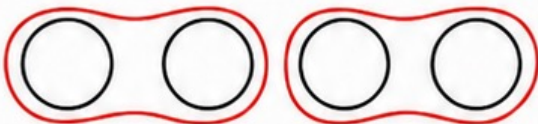
Worksheet 1 • Page 1

Name: ANSWERS

Date: _____

Draw a loop around each pair. Then circle ODD or EVEN.

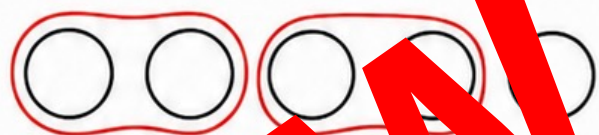
1.



ODD

EVEN

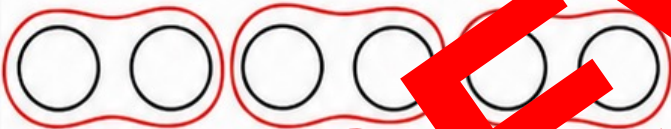
2.



ODD

EVEN

3.



ODD

EVEN

4.



ODD

EVEN

5.



ODD

EVEN

6.



ODD

EVEN

What do you notice about even groups?

Every counter has a partner; none are left over.

PAIRING AND LEFTOVERS



Worksheet 1 • Page 2

Name: _____

Date: _____

A. Complete each statement.

1. 14 can make _____ pairs with _____ left over. It is ODD / EVEN.
2. 19 can make _____ pairs with _____ left over. It is ODD / EVEN.
3. 32 can make _____ pairs with _____ left over. It is ODD / EVEN.
4. 45 can make _____ pairs with _____ left over. It is ODD / EVEN.
5. 58 can make _____ pairs with _____ left over. It is ODD / EVEN.
6. 73 can make _____ pairs with _____ left over. It is ODD / EVEN.

B. Draw or describe pairs to prove your thinking.

7. Show why 28 is even.

8. Show why 31 is odd.

C. Finish the rules.

An even number has _____ left over.

An odd number has _____ left over.

PAIRING AND LEFTOVERS



Worksheet 1 • Page 2

Name: ANSWERS

Date: _____

A. Complete each statement.

1. 14 can make 7 pairs with 0 left over. It is ODD / EVEN.
2. 19 can make 9 pairs with 1 left over. It is ODD / EVEN.
3. 32 can make 16 pairs with 0 left over. It is ODD / EVEN.
4. 45 can make 22 pairs with 1 left over. It is ODD / EVEN.
5. 58 can make 29 pairs with 0 left over. It is ODD / EVEN.
6. 73 can make 36 pairs with 1 left over. It is ODD / EVEN.

B. Draw or describe pairs to prove your thinking.

7. Show why 28 is even.

14 pairs, 0 left over.

8. Show why 31 is odd.

15 pairs, 1 left over.

C. Finish the rules.

An even number has 0 left over.

An odd number has 1 left over.



LAST-DIGIT DETECTIVES

Worksheet 2 • Page 1

Name: _____

Date: _____

Underline the last digit. Then circle ODD or EVEN.

1. 247	ODD EVEN	2. 1,368	ODD EVEN
3. 5,019	ODD EVEN	4. 4,200	ODD EVEN
5. 73,451	ODD EVEN	6. 82,764	ODD EVEN
7. 999	ODD EVEN	8. 10,002	ODD EVEN
9. 6,203	ODD EVEN	10. 7,840	ODD EVEN
11. 45,678	ODD EVEN	12. 90,111	ODD EVEN

Which digit tells you whether a whole number is odd or even?



LAST-DIGIT DETECTIVES

Worksheet 2 • Page 1

Name: ANSWERS

Date: _____

Underline the last digit. Then circle ODD or EVEN.

1. 24 <u>7</u> <u>ODD</u> EVEN	2. 1,36 <u>8</u> ODD <u>EVEN</u>
3. 5,01 <u>9</u> <u>ODD</u> EVEN	4. 4,20 <u>0</u> ODD <u>EVEN</u>
5. 73,45 <u>1</u> <u>ODD</u> EVEN	6. 82,76 <u>4</u> ODD <u>EVEN</u>
7. 99 <u>9</u> <u>ODD</u> EVEN	8. 10,00 <u>2</u> ODD <u>EVEN</u>
9. 6,20 <u>5</u> <u>ODD</u> EVEN	10. 7,84 <u>0</u> ODD <u>EVEN</u>
11. 45,67 <u>8</u> ODD <u>EVEN</u>	12. 90,11 <u>1</u> <u>ODD</u> EVEN

Which digit tells you whether a whole number is odd or even?

The ones digit (last digit).

LAST-DIGIT DETECTIVES

Worksheet 2 • Page 2



Name: _____

Date: _____

A. Write one possible number.

1. A 4-digit odd number ending in 3: _____
2. A 5-digit even number ending in 0: _____
3. An odd number between 6,420 and 6,440: _____
4. An even number greater than 20,000 but less than 20,050: _____
5. A number that becomes even if its final digit changes: _____

B. Circle all the numbers that match.

6. Odd: 2,304 2,315 2,329 2,410 2,467
7. Even: 18,111 18,114 18,236 18,405 18,570
8. Even and greater than 50,000: 50,302 49,998 50,117 51,240 52,555

C. Explain your thinking.

9. Does changing the tens digit not change whether a number is odd or even?

10. Mia says 7,890 is odd because its thousands digit is 7. Explain her error.

LAST-DIGIT DETECTIVES

Worksheet 2 • Page 2



Name: ANSWERS

Date: _____

A. Write one possible number.

1. A 4-digit odd number ending in 3:

1,243

2. A 5-digit even number ending in 0:

12,340

3. An odd number between 6,420 and 6,440:

6,431

4. An even number greater than 20,000 but less than 20,050:

20,020

5. A number that becomes even if its final digit changes:

1,243

B. Circle all the numbers that match.

6. Odd:

2,304

2,315

2,329

2,410

2,467

7. Even:

18,111

18,124

18,236

18,405

18,570

8. Even and greater than 50,000:

51,302

49,998

50,117

51,240

52,555

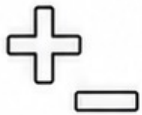
C. Explain your thinking.

9. Why does changing the tens digit not change whether a number is odd or even?

Parity is determined by the ones digit, so changing the tens digit does not change it.

10. Mia says 7,890 is odd because its thousands digit is 7. Explain her error.

The ones digit is 0, so 7,890 is even.



ADDITION AND SUBTRACTION PARITY LAB

Worksheet 3 • Page 1



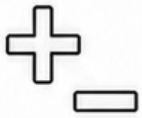
Name: _____

Date: _____

Predict first. Then calculate and check.

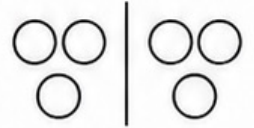
Expression	Predict: ODD or EVEN	Answer	Check: ODD or EVEN
1. $38 + 25$			
2. $47 + 31$			
3. $126 + 408$			
4. $235 + 142$			
5. $92 - 37$			
6. $15 - 4$			
7. $60 - 228$			
8. $731 - 406$			

What pattern do you notice when both numbers have the same parity?



ADDITION AND SUBTRACTION PARITY LAB

Worksheet 3 • Page 1



Name: ANSWERS

Date: _____

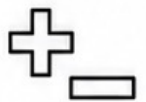
Predict first. Then calculate and check.

Expression	Predict: ODD or EVEN	Answer	Check: ODD or EVEN
1. $38 + 25$	ODD	63	ODD
2. $47 + 31$	EVEN	78	EVEN
3. $126 + 408$	EVEN	534	EVEN
4. $235 + 142$	ODD	377	ODD
5. $92 - 37$	ODD	55	ODD
6. $55 - 4$	EVEN	44	EVEN
7. $600 - 228$	EVEN	376	EVEN
8. $731 - 406$	ODD	325	ODD

What pattern do you notice when both numbers have the same parity?

Adding or subtracting numbers with the same parity gives an even answer.

ADDITION AND SUBTRACTION PARITY LAB



Worksheet 3 • Page 2

Name: _____

Date: _____

A. Complete the patterns.

$$\text{ODD} + \text{ODD} = \underline{\hspace{2cm}}$$

$$\text{EVEN} + \text{EVEN} = \underline{\hspace{2cm}}$$

$$\text{ODD} + \text{EVEN} = \underline{\hspace{2cm}}$$

$$\text{ODD} - \text{ODD} = \underline{\hspace{2cm}}$$

$$\text{EVEN} - \text{EVEN} = \underline{\hspace{2cm}}$$

$$\text{ODD} - \text{EVEN} = \underline{\hspace{2cm}}$$

B. Without calculating, circle ODD or EVEN in the result.

1. $4,315 + 2,781$ ODD EVEN

2. $8,240 + 5,117$ ODD EVEN

3. $9,999 - 3,503$ ODD EVEN

4. $7,624 - 1,234$ ODD EVEN

5. $123,456 + 78,901$ ODD EVEN

6. $56,789 - 12,340$ ODD EVEN

C. Write ODD or EVEN in each blank.

7. $\text{EVEN} + \underline{\hspace{2cm}} = \text{ODD}$

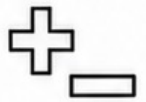
8. $\text{ODD} + \underline{\hspace{2cm}} = \text{EVEN}$

9. $\text{EVEN} - \underline{\hspace{2cm}} = \text{EVEN}$

10. $\text{ODD} - \underline{\hspace{2cm}} = \text{ODD}$

Explain one answer using a parity pattern.

ADDITION AND SUBTRACTION PARITY LAB



Worksheet 3 • Page 2

Name: ANSWERS

Date: _____

A. Complete the patterns.

$$\text{ODD} + \text{ODD} = \underline{\text{EVEN}}$$

$$\text{EVEN} + \text{EVEN} = \underline{\text{EVEN}}$$

$$\text{ODD} + \text{EVEN} = \underline{\text{ODD}}$$

$$\text{ODD} - \text{ODD} = \underline{\text{EVEN}}$$

$$\text{EVEN} - \text{EVEN} = \underline{\text{EVEN}}$$

$$\text{ODD} - \text{EVEN} = \underline{\text{ODD}}$$

B. Without calculating, circle ODD or EVEN in the result.

1. $4,315 + 2,781$ ODD EVEN

2. $8,240 + 5,117$ ODD EVEN

3. $9,999 - 3,503$ ODD EVEN

4. $7,624 - 1,234$ ODD EVEN

5. $123,456 + 78,901$ ODD EVEN

6. $56,789 - 12,340$ ODD EVEN

C. Circle ODD or EVEN in each blank.

7. EVEN + ODD = ODD

8. ODD + ODD = EVEN

9. EVEN - EVEN = EVEN

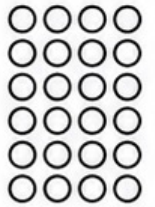
10. ODD - EVEN = ODD

Explain one answer using a parity pattern.

For item 1, odd + odd gives an even result.

MULTIPLICATION PARITY LAB

Worksheet 4 • Page 1



Name: _____

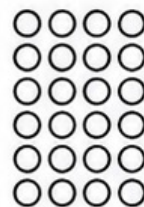
Date: _____

Predict first. Then calculate and check.

Expression	Factor parity	Predict result	Calculate and check
1. 7×5			
2. 6×9			
3. 12×7			
4. 11×11			
5. 14×8			
6. 12×10			
7. 2×3			
8. 15×9			

What do all even products have in common?

MULTIPLICATION PARITY LAB



Worksheet 4 • Page 1

Name: _____

ANSWERS

Date: _____

Predict first. Then calculate and check.

Expression	Factor parity	Predict result	Calculate and check
1. 7×5	ODD $\times$ ODD	ODD	35 — ODD
2. 6×9	EVEN $\times$ ODD	EVEN	54 — EVEN
3. 12×7	EVEN $\times$ ODD	EVEN	84 — EVEN
4. 11×11	ODD $\times$ ODD	ODD	121 — ODD
5. 14×8	EVEN $\times$ EVEN	EVEN	112 — EVEN
6. 13×5	ODD $\times$ ODD	ODD	65 — ODD
7. 24×3	EVEN $\times$ ODD	EVEN	72 — EVEN
8. 15×9	ODD $\times$ ODD	ODD	135 — ODD

What do all even products have in common?

Each even product has at least one even factor.

MULTIPLICATION PARITY LAB

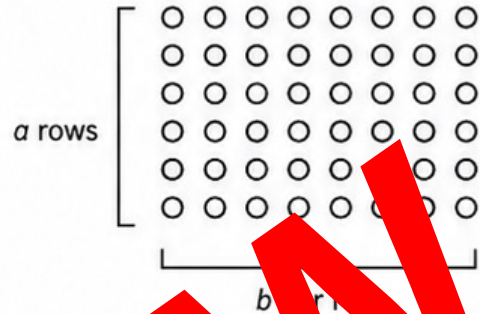
Worksheet 4 • Page 2

Name: _____

Date: _____

A. Without calculating, circle ODD or EVEN for the product.

- | | | |
|--------------------|-----|------|
| 1. 27×39 | ODD | EVEN |
| 2. 58×71 | ODD | EVEN |
| 3. 103×22 | ODD | EVEN |
| 4. 95×15 | ODD | EVEN |
| 5. 246×17 | ODD | EVEN |
| 6. 301×49 | ODD | EVEN |



B. Circle the best answer.

7. Which product is odd?
A. 8×13 B. 7×11 C. 4×5 D. 9×20
8. A product is even. What can you say for certain?
A. Both factors are even.
B. At least one factor is even.
C. The factors are the same.
D. The product ends in 5.

C. Write ODD or EVEN in each blank.

9. $\text{ODD} \times \text{_____} = \text{ODD}$ 10. $\text{EVEN} \times \text{_____} = \text{EVEN}$
11. $\text{_____} \times \text{ODD} = \text{EVEN}$ 12. $\text{_____} \times \text{_____} = \text{ODD}$

D. Apply the pattern.

13. A theatre has 17 rows of 9 seats. Without calculating, is the total odd or even? Explain.

14. Why can an even factor never make an odd product?

MULTIPLICATION PARITY LAB

Worksheet 4 • Page 2

Name: ANSWERS

Date: _____

A. Without calculating, circle ODD or EVEN for the product.

1. 27×39 ODD EVEN

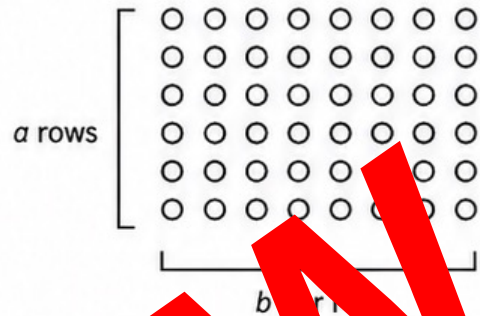
2. 58×71 ODD EVEN

3. 103×22 ODD EVEN

4. 95×15 ODD EVEN

5. 246×17 ODD EVEN

6. 301×49 ODD EVEN



B. Circle the best answer.

7. Which product is odd?

A. 8×13

B. 7×11

C. 4×5

D. 9×20

8. A product is even. What can you say for certain?

A. Both factors are even.

B. At least one factor is even.

C. The factors are the same.

D. The product ends in 5.

C. Write ODD or EVEN in each blank.

9. $\text{ODD} \times \text{ODD} = \text{ODD}$

10. $\text{EVEN} \times \text{ODD or EVEN} = \text{EVEN}$

11. $\text{EVEN} \times \text{ODD} = \text{EVEN}$

12. $\text{ODD} \times \text{ODD} = \text{ODD}$

D. Apply the pattern.

13. A theatre has 17 rows of 9 seats. Without calculating, is the total odd or even? Explain.

Odd. Both factors are odd, so the product is odd.

14. Why can an even factor never make an odd product?

An even factor can be split into pairs; repeating those pairs keeps the product even.



PARITY PUZZLES AND REASONING



Worksheet 5 • Page 1

2 4 6 8

Name: _____ Date: _____

A. Write one possible whole number in each blank.

1. $18 + \underline{\hspace{2cm}}$ = an odd number
2. $35 + \underline{\hspace{2cm}}$ = an even number
3. $64 - \underline{\hspace{2cm}}$ = an odd number
4. $91 - \underline{\hspace{2cm}}$ = an even number
5. $\underline{\hspace{2cm}} \times 7$ = an even number
6. $\underline{\hspace{2cm}} \times 9$ = an odd number

B. Circle TRUE or FALSE. Correct each false statement.

7. ODD + ODD = ODD TRUE FALSE
Correction: _____
8. EVEN - ODD = ODD TRUE FALSE
Correction: _____
9. ODD $\times$ EVEN = ODD TRUE FALSE
Correction: _____
10. ODD - ODD = ODD TRUE FALSE
Correction: _____

C. Explain and create.

11. Sam says $246 + 318$ must be odd because the numbers are different. Explain Sam's error.

12. Choose two odd numbers whose sum is 100. Show your equation.



1 3 5 7 9



PARITY PUZZLES AND REASONING



Worksheet 5 • Page 1

2 4 6 8

Name: ANSWERS Date: _____

A. Write one possible whole number in each blank.

1. $18 + \underline{1} =$ an odd number 4. $91 - \underline{1} =$ an even number
2. $35 + \underline{1} =$ an even number 5. $\underline{2} \times 7 =$ an even number
3. $64 - \underline{1} =$ an odd number 6. $\underline{3} \times 9 =$ an odd number

B. Circle TRUE or FALSE. Correct each false statement.

7. $\text{ODD} + \text{ODD} = \text{ODD}$ TRUE FALSE
Correction: $\text{ODD} + \text{ODD} = \text{EVEN}$
8. $\text{EVEN} - \text{ODD} = \text{ODD}$ TRUE FALSE
Correction: _____
9. $\text{ODD} \times \text{EVEN} = \text{ODD}$ TRUE FALSE
Correction: $\text{ODD} \times \text{EVEN} = \text{EVEN}$
10. $\text{ODD} - \text{ODD} = \text{ODD}$ TRUE FALSE
Correction: _____

C. Explain and create.

11. Sam says $246 + 318$ must be odd because the numbers are different. Explain Sam's error.

Both 246 and 318 are even, so their sum is even (564).

12. Choose two odd numbers whose sum is 100. Show your equation.

$49 + 51 = 100$

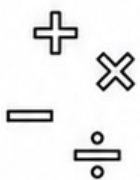


1 3 5 7 9



PARITY PUZZLES AND REASONING

Worksheet 5 • Page 2



Name: _____

Date: _____

A. Track the parity without calculating.

Expression	First result	Final result
1. $(4,321 + 7,555) \times 3$		
2. $(8,240 - 1,115) + 6,302$		
3. $13 \times 9 + 24$		
4. $18 \times 7 - 35$		

B. Find and fix each error.

5. Luca says 15×8 is odd because 15 is odd. Correct him.

6. Zoe says $642 - 318$ is odd because the digits are mixed. Correct her.

C. Create and justify.

7. Write an addition expression with two odd 3-digit numbers and an even result.

8. Write a multiplication expression with an odd product.

9. Can $\text{EVEN} + \text{EVEN}$ ever equal ODD ? Explain.

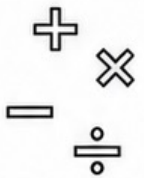
10. Can $\text{ODD} \times \text{EVEN}$ ever equal ODD ? Explain.





PARITY PUZZLES AND REASONING

Worksheet 5 • Page 2



Name: ANSWERS

Date: _____

A. Track the parity without calculating.

Expression	First result	Final result
1. $(4,321 + 7,555) \times 3$	EVEN	EVEN
2. $(8,240 - 1,115) + 6,302$	ODD	ODD
3. $13 \times 9 + 24$	ODD	ODD
4. $18 \times 7 - 35$	EVEN	ODD

B. Find and fix each error.

5. Luca says 15×8 is odd because 15 is odd. Correct her.

15 is odd, but 8 is even; an even factor makes the product even (120).

6. Zoe says $642 - 318$ is odd because the digits are mixed. Correct her.

Both 642 and 318 are even; even minus even is even, and the result is 324.

C. Create and justify.

7. Write an addition expression with two odd 3-digit numbers and an even result.

$$125 + 301 = 426$$

8. Write a multiplication expression with an odd product.

$$7 \times 9 = 63$$

9. Can $\text{EVEN} + \text{EVEN}$ ever equal ODD ? Explain.

No. $\text{EVEN} + \text{EVEN}$ always equals EVEN .

10. Can $\text{ODD} \times \text{EVEN}$ ever equal ODD ? Explain.

No. Any even factor makes the product EVEN .



ODD AND EVEN NUMBERS CHECK-UP

Assessment • Page 1

Name: _____

Date: _____

A. Identify and create.

1. 5,432 ODD EVEN

2. 9,017 ODD EVEN

3. 24,680 ODD EVEN

4. 71,111 ODD EVEN

5. Write an odd number between 4,500 and 4,520: _____

6. Write an even number greater than 30,000 but less than 30,050: _____

B. Predict the result without calculating.

7. $317 + 805$ ODD EVEN

8. $2,460 + 7,123$ ODD EVEN

9. $8,005 - 3,117$ ODD EVEN

10. $9,240 - 2,304$ ODD EVEN

11. 17×9 ODD EVEN

12. 26×5 ODD EVEN

C. Complete each parity pattern.

13. ODD + ODD = _____

14. EVEN - ODD = _____

15. ODD $\times$ ODD = _____

16. EVEN $\times$ any whole number = _____

D. Show one way to prove that 37 is odd.

ODD AND EVEN NUMBERS CHECK-UP

Assessment • Page 1

Name: ANSWERS

Date: _____

A. Identify and create.

- | | | |
|-----------|------------|-------------|
| 1. 5,432 | ODD | <u>EVEN</u> |
| 2. 9,017 | <u>ODD</u> | EVEN |
| 3. 24,680 | ODD | <u>EVEN</u> |
| 4. 71,111 | <u>ODD</u> | EVEN |

5. Write an odd number between 4,500 and 4,520: 4,511
6. Write an even number greater than 30,000 but less than 30,050: 30,024

B. Predict the result without calculating.

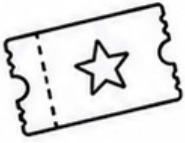
- | | | |
|---------------------|------------|-------------|
| 7. $317 + 805$ | ODD | <u>EVEN</u> |
| 8. $2,460 + 7,123$ | <u>ODD</u> | EVEN |
| 9. $8,005 - 3,117$ | ODD | <u>EVEN</u> |
| 10. $9,240 - 2,304$ | ODD | <u>EVEN</u> |
| 11. 17×9 | <u>ODD</u> | EVEN |
| 12. 26×5 | ODD | <u>EVEN</u> |

C. Complete each parity pattern.

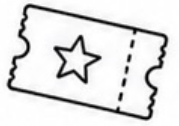
13. $\text{ODD} + \text{ODD} = \underline{\text{EVEN}}$
14. $\text{EVEN} - \text{ODD} = \underline{\text{ODD}}$
15. $\text{ODD} \times \text{ODD} = \underline{\text{ODD}}$
16. $\text{EVEN} \times \text{any whole number} = \underline{\text{EVEN}}$

D. Show one way to prove that 37 is odd.

37 makes 18 pairs with 1 left over; its last digit 7 is odd.



ODD AND EVEN NUMBERS CHECK-UP



Assessment • Page 2

Name: _____

Date: _____

THE FESTIVAL NUMBER TRAIL

1. Hall A has 23 rows of 15 seats. Predict whether the total is odd or even. Explain without calculating.

2. The festival records 1,247 morning visitors and 836 afternoon visitors. Predict the total's parity, then calculate.

3. There are 5,000 wristbands. Staff use 1,875. Predict the remaining number's parity, then calculate.



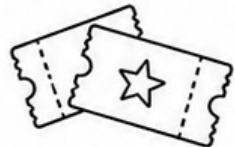
4. A stall prepares 18 boxes with 7 items in each box. Predict the total's parity, then calculate.



ANALYSE AND CREATE

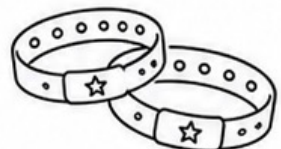
5. Mary says $6,789 + 3,145$ is odd. Is she correct? Explain and calculate.

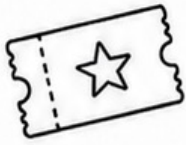
6. Write two different addition expressions with an odd result.



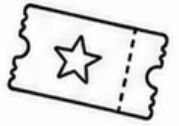
7. Write a multiplication expression with an even product. Explain how you know without calculating.

8. Explain why the last digit is enough to decide whether a whole number is odd or even.





ODD AND EVEN NUMBERS CHECK-UP



Assessment • Page 2

Name: _____ **ANSWERS** _____

Date: _____

THE FESTIVAL NUMBER TRAIL

1. Hall A has 23 rows of 15 seats. Predict whether the total is odd or even. Explain without calculating.

Odd. 23 and 15 are odd, so the product is odd. $23 \times 15 = 345$.

2. The festival records 1,247 morning visitors and 836 afternoon visitors. Predict the total's parity, then calculate.

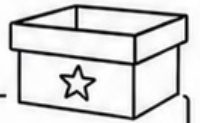
Odd + even gives odd. $1,247 + 836 = 2,083$, which is odd.

3. There are 5,000 wristbands. Staff use 1,875. Predict the remaining number's parity, then calculate.



Even - odd gives odd. $5,000 - 1,875 = 3,125$, which is odd.

4. A stall prepares 18 boxes with 7 tins in each box. Predict the total's parity, then calculate.



An even factor makes an even product. $18 \times 7 = 126$.

ANALYSE AND CREATE

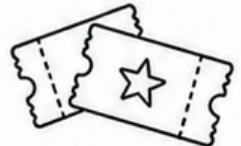
5. N says $6,780 + 3,142$ is odd. Is she correct? Explain and calculate.

No. Even + even is even. $6,780 + 3,142 = 9,922$.

6. Write two different addition expressions with an odd result.

$125 + 208 = 333$

$407 + 612 = 1,019$

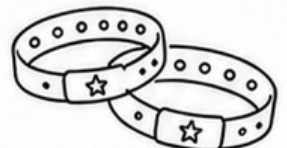


7. Write a multiplication expression with an even product. Explain how you know without calculating.

$24 \times 7 = 168$. The factor 24 is even, so the product is even.

8. Explain why the last digit is enough to decide whether a whole number is odd or even.

Every group of ten can be paired, so the ones digit decides whether one is left over.





ODD AND EVEN NUMBERS YEAR 4 RUBRIC

1 2 3 4
• • • • •

Student: _____

Date: _____

CRITERIA	BEGINNING	DEVELOPING	ACHIEVING	CONFIDENT	EXCEEDING
1. Recognises and represents parity	☐ Needs help to identify odd and even numbers.	☐ Identifies some numbers with prompts.	☐ Correctly identifies familiar numbers.	☐ Correctly identifies multi-digit numbers.	☐ Justifies parity in more than one way.
2. Uses the last-digit rule	☐ Does not yet use the final digit reliably.	☐ Uses the rule inconsistently.	☐ Uses the final digit correctly.	☐ Applies the rule quickly to large numbers.	☐ Explains why the rule works.
3. Predicts addition and subtraction parity	☐ Needs support to notice patterns.	☐ Predicts some combinations.	☐ Predicts common combinations.	☐ Predicts all combinations and checks.	☐ Generalises and creates correct examples.
4. Predicts multiplication parity	☐ Needs support to notice factor patterns.	☐ Predicts some products.	☐ Uses odd x odd and even x even rules.	☐ Applies both rules accurately.	☐ Generalises and creates correct examples.
5. Explains and verifies reasoning	☐ Gives little relevant reasoning.	☐ Gives a partial explanation.	☐ Gives a clear reason or example.	☐ Gives patterns and calculations to verify.	☐ Compares strategies and corrects errors.

Odd and Even Numbers



Learning Goals

- Students will learn to:
- identifying odd and even whole numbers
 - explaining parity by pairing objects
 - using the least digit to classify large numbers
 - predict odd/even results in calculations



Pairing Reveals Parity

An even number can be split into pairs with no leftovers.

An odd number leaves exactly one object unpaired.

$12 \rightarrow 6$ complete pairs $\rightarrow$ even

$13 \rightarrow 6$ pairs and 1 leftover $\rightarrow$ odd



Use the Last Digit

A whole number is even when its last digit is:

0, 2, 4, 6 or 8

A whole number is odd when its last digit is:

1, 3, 5, 7 or 9

Only the ones digit decides parity.



Quick Classification

Decide without calculating anything else.

4,286 → last digit 6 → even

1,913 → last digit 3 → odd

10,000 → last digit 0 → even

999,999 → last digit 9 → odd



Addition Patterns

even + even = even

odd + odd = even

even + odd = odd

odd + even = odd

examples to test each pattern.



Why the Addition Rules Work

Even addends contribute complete pairs.

Two odd addends each contribute one leftover. Those two leftovers make
a new pair.

One odd addend contributes one leftover, so an even-odd sum is odd.



Subtraction Patterns

even - even = even

odd - odd = even

even - odd = odd

odd - even = odd

The same-parity difference is even.

The different-parity difference is odd.



Predict, Then Calculate

Predict the parity first. Then calculate to check.

$$478 + 319 \rightarrow \text{even} + \text{odd} \rightarrow \text{odd} \rightarrow 787$$

$$106 + 571 \rightarrow \text{even} + \text{odd} \rightarrow \text{odd} \rightarrow 685$$

$$543 + 209 \rightarrow \text{odd} + \text{odd} \rightarrow \text{even} \rightarrow 752$$



Multiplication Patterns

If either factor is even, the product is even.

Only odd $\times$ odd gives an odd product.

$$6 \times 7 = 42 \rightarrow \text{even}$$

$$9 \times 5 = 45 \rightarrow \text{odd}$$

$$12 \times 11 = 132 \rightarrow \text{even}$$



Why Multiplication Works

Multiplication makes equal groups.

An even factor supplies complete pairs, so the whole product can be paired.

With odd $\times$ odd, every group is odd and an odd number of leftovers remains odd.



Practise the Patterns

Predict each result of odd + even.

$$23 + 47$$

$$91$$

$$14 \times 9$$

$$7 \times 11$$

$$625 + 377$$

Then calculate to confirm.



Find the Missing Parity

Use the result to reason backwards.

$$\text{even} + \underline{\hspace{1cm}} = \text{odd} \rightarrow \text{odd}$$

$$\text{odd} + \underline{\hspace{1cm}} = \text{even} \rightarrow \text{odd}$$

$$\text{even} \times \underline{\hspace{1cm}} = \text{even} \rightarrow \text{either parity}$$

$$\text{odd} \times \underline{\hspace{1cm}} = \text{odd} \rightarrow \text{odd}$$



Decide Without Calculating

$$1,248 + 176$$

Both addends are even, so the sum is even.

$$99 \times 10$$

Both factors are odd, so the product is odd.

$$70,005 - 8,002$$

Odd - even gives an odd difference.



Spot the Error

Claim: '999 + 101 is odd because both addends are odd.'

The claim is correct.

Odd + odd = even.

999 + 101 = 1,100, which is even.

Always use the parity pattern before checking the calculation.



Explain Your Reasoning

A strong explanation makes a claim, gives evidence, and explains.

Example:

'12,345 is odd because its last digit is 5. Numbers ending in 1, 3, 5, 7 or 9 are odd.'

Use: claim + rule + evidence.



Parity Summary

- Pairing: no leftover means even, one leftover means odd.
- Last digit 0, 2, 4, 6, 8 means even.
- Same parity sum and differences are even.
- A product is odd only when both factors are odd.





Well Done!

Odd and Even Numbers Quiz



Question 1

True or false?

362 is an even number.



Answer 1

True

52 ends in 2, so it is even.



Question 2

Is 72457 odd or even?
Explain using the last digit.



Answer 2

Odd

73, and numbers ending in 7 are odd.



Question 2

What is the parity of $425 + 318$?

A. odd B. even



Answer 3

A. No

425 is odd and 318 is even.

odd + even = odd.



Question 11

Predict the parity of $906 - 221$.

Then calculate to check.



Answer 4

even - odd = odd.

odd - 221 = 685.



Question 5

Which combination of two numbers has an even sum?

A. odd + even

B. odd + odd

C. even + odd



Answer 5

B. odd + odd

The two letters pair together, so the sum is even.



Question 6

True or false?

An odd number multiplied by an odd number is always odd.



Answer 6

True

Any odd $\times$ odd produces an odd product.



Question 3

Complete the number statement.

even + ____ odd

Should the missing addend be odd or even?



Answer 7

Adding one odd addend to an even addend leaves one unpaired unit.



Question 8

Which product is even?

A. 4×5

B. 7×11

C. 6×7

D. 3×13



Answer 8

C. 6

A product is even when at least one factor is even.



Question a

Explain why 345 is odd without dividing or calculating.



Answer a

Its last digit is 5.

Any whole number ending in 1, 3, 5, 7 or 9 is odd.



Question 10

Correct this claim:

'90 + 101 = 191 because both addends are odd.'



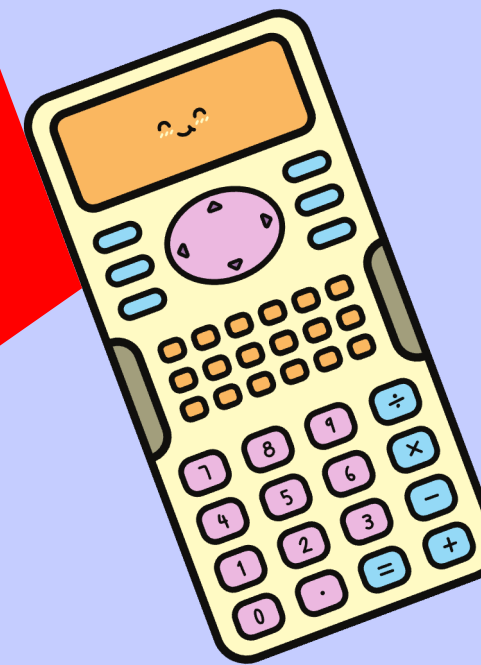
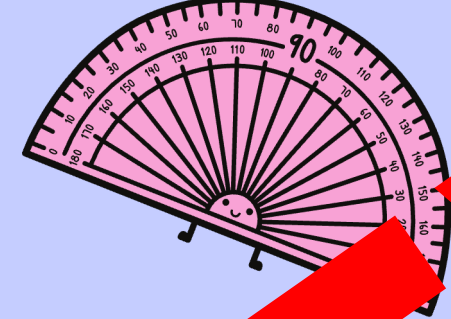
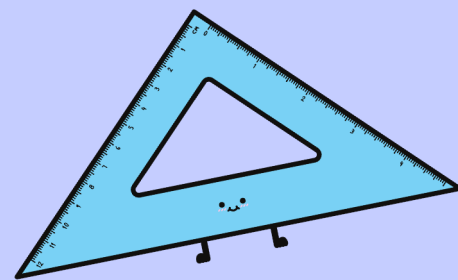
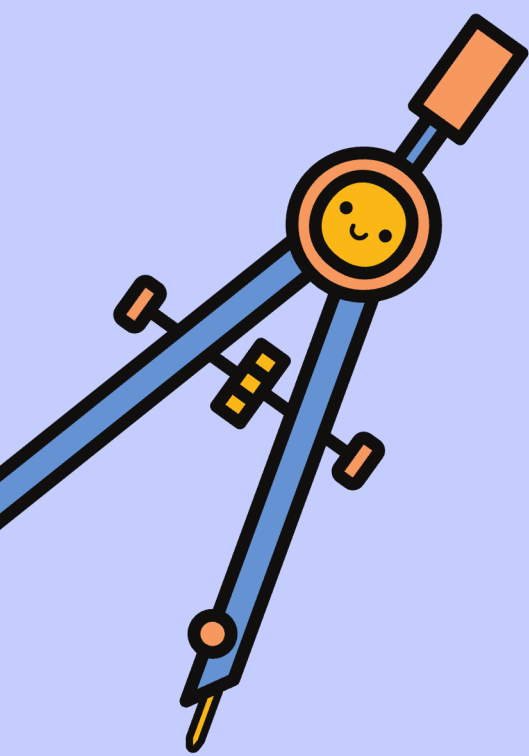
Answer 10

The sum is even.

odd + odd = even.

$$99 + 101 = 1,100.$$





Well Done!

