Factor Matchup

Sort complete prime factorizations from incomplete ones.

5.NS.2.c "Determine the prime factorization for a whole number up to 100."

NAME _____ DATE _____

COMPLETE PRIME FACTORIZATION

A complete prime factorization has only prime numbers as factors. The factors multiply to the original number.

$70 = 2 \times 5 \times 7$

INCOMPLETE FACTORIZATION

An incomplete factorization has at least one composite number as a factor. Break the composite factor into prime factors to finish it.

$72 = 8 \times 3 \times 3$

1 SORT

8 items

For each equation, circle COMPLETE or INCOMPLETE, then choose two items and explain how you knew each choice.

1. $54 = 2 \times 3 \times 3 \times 3$ COMPLETE INCOMPLETE

2. $48 = 6 \times 2 \times 2 \times 2$ COMPLETE INCOMPLETE

3. $75 = 15 \times 5$ COMPLETE INCOMPLETE

4. $98 = 2 \times 7 \times 7$ COMPLETE INCOMPLETE

5. $60 = 2 \times 2 \times 3 \times 5$ COMPLETE INCOMPLETE

6. $81 = 3 \times 3 \times 3 \times 3$ COMPLETE INCOMPLETE

7. $56 = 7 \times 4 \times 2$ COMPLETE INCOMPLETE

8. $45 = 3 \times 3 \times 5$ COMPLETE INCOMPLETE

2 PROVE IT

Explain your thinking

Pick two items from Part 1. For each one, tell how you knew where it belonged.

ITEM # _____ **HOW I KNEW** _____

ITEM # _____ **HOW I KNEW** _____

3 MAKE YOUR OWN

One of each

Write one new COMPLETE example and one new INCOMPLETE example. Each equation must equal the number on the left.

COMPLETE _____

INCOMPLETE _____

CHALLENGE

Write the complete prime factorization of 96. Then write a different factorization of 96 that is incomplete because it has a composite factor.

ANSWER KEY

Factor Matchup

GRADE 5 · 5.NS.2.c

PART 1 · SORT

#	ITEM	CATEGORY	WHY
1	54 = 2 × 3 × 3 × 3	**COMPLETE**	All factors are prime, and 2 × 3 × 3 × 3 = 54.
2	48 = 6 × 2 × 2 × 2	**INCOMPLETE**	The factors equal 48, but 6 is composite.
3	75 = 15 × 5	**INCOMPLETE**	The factors equal 75, but 15 is composite.
4	98 = 2 × 7 × 7	**COMPLETE**	All factors are prime, and 2 × 7 × 7 = 98.
5	60 = 2 × 2 × 3 × 5	**COMPLETE**	All factors are prime, and 2 × 2 × 3 × 5 = 60.
6	81 = 3 × 3 × 3 × 3	**COMPLETE**	All factors are prime, and 3 × 3 × 3 × 3 = 81.
7	56 = 7 × 4 × 2	**INCOMPLETE**	The factors equal 56, but 4 is composite.
8	45 = 3 × 3 × 5	**COMPLETE**	All factors are prime, and 3 × 3 × 5 = 45.

PART 2 · PROVE IT

Accept any explanation that names the deciding feature from the rule box for the chosen item.

PART 3 · MAKE YOUR OWN (SAMPLE ANSWERS)

- **COMPLETE**: 84 = 2 × 2 × 3 × 7
- **INCOMPLETE**: 90 = 9 × 2 × 5

Challenge: 96 = 2 × 2 × 2 × 2 × 2 × 3. An incomplete factorization is 96 = 12 × 2 × 2 × 2 because 12 is composite.

COMPLETE: 1, 4, 5, 6, 8. INCOMPLETE: 2, 3, 7. For explanations, students should identify the composite factor in incomplete equations or verify that every factor is prime in complete equations.