

Factor Detectives

Use factors to sort prime and composite numbers.

4.PAR.3 "Generate and analyze patterns, including those involving shapes, input/output diagrams, factors, multiples, prime numbers, and composite numbers."

NAME _____

DATE _____

PRIME NUMBERS

A prime number has exactly two factors, 1 and itself.

19 is prime because its only factors are 1 and 19.

COMPOSITE NUMBERS

A composite number has more than two factors.

21 is composite because its factors are 1, 3, 7, and 21.

1 SORT

8 items

Circle PRIME or COMPOSITE for each number, then choose two numbers and explain your choices by listing all of their factors.

1. 14

PRIME

COMPOSITE

2. 23

PRIME

COMPOSITE

3. 27

PRIME

COMPOSITE

4. 29

PRIME

COMPOSITE

5. 31

PRIME

COMPOSITE

6. 32

PRIME

COMPOSITE

7. 37

PRIME

COMPOSITE

8. 39

PRIME

COMPOSITE

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 PRIME number and one new COMPOSITE number. List the factors of each number.

PRIME _____

COMPOSITE _____

CHALLENGE

Write a composite number between 40 and 50 that has exactly four factors. List its factors.

PART 1 • SORT

#	ITEM	CATEGORY	WHY
1	14	COMPOSITE	Its factors are 1, 2, 7, and 14.
2	23	PRIME	Its only factors are 1 and 23.
3	27	COMPOSITE	Its factors are 1, 3, 9, and 27.
4	29	PRIME	Its only factors are 1 and 29.
5	31	PRIME	Its only factors are 1 and 31.
6	32	COMPOSITE	It has factors besides 1 and 32, such as 2, 4, 8, and 16.
7	37	PRIME	Its only factors are 1 and 37.
8	39	COMPOSITE	Its factors are 1, 3, 13, and 39.

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)

- **PRIME:** 41, with factors 1 and 41.
- **COMPOSITE:** 35, with factors 1, 5, 7, and 35.

Challenge: 46, with factors 1, 2, 23, and 46.

For Part 2, students may choose any two items. Check that each student lists all factors and uses the number of factors to justify the category.