

Factor Detective Files

Find factor pairs and classify each number.

GRADE 4 • MA.4.AR.3.1

MA.4.AR.3.1 "Determine factor pairs for a whole number from 0 to 144. Determine whether a whole number from 0 to 144 is prime, composite or neither."

NAME _____

DATE _____

FACTOR PAIR CLUES

A factor pair is two whole numbers that multiply to make a number. A prime number has exactly two factors, 1 and itself, while a composite number has more than two factors. Numbers that do not fit either definition are neither.

WORKED EXAMPLE

Find all factor pairs of 72. Then classify 72.

1. Start with 1: $1 \times 72 = 72$.
2. Test divisors: 2×36 , 3×24 , 4×18 , 6×12 , and 8×9 all equal 72.
3. The pairs show that 72 has more than two factors.

Answer: Factor pairs: 1×72 , 2×36 , 3×24 , 4×18 , 6×12 , 8×9 . 72 is composite.

PRACTICE 6 problems

- 1** Find all factor pairs of 36. Is 36 prime, composite, or neither?

ANSWER _____

- 2** Find all factor pairs of 29. Is 29 prime, composite, or neither?

ANSWER _____

- 3** Find all factor pairs of 48. Is 48 prime, composite, or neither?

ANSWER _____

- 4** Find all factor pairs of 49. Is 49 prime, composite, or neither?

ANSWER _____

- 5** Find all factor pairs of 64. Is 64 prime, composite, or neither?

ANSWER _____

- 6** Find all factor pairs of 97. Is 97 prime, composite, or neither?

ANSWER _____

APPLY IT Show your work

- 1** The art club has 24 stickers to arrange in equal rows for a display. List every factor pair that could describe the number of rows and stickers in each row. Is 24 prime, composite, or neither?

WORK SPACE

ANSWER _____

- 2** A game club has 37 prize tokens. List every factor pair for 37 to see how the tokens could be arranged in equal rows. Is 37 prime, composite, or neither?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Maya says 91 is prime because it is odd and does not end in 5. Is Maya correct? Find a factor pair to prove your answer.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Find all factor pairs of 36. Is 36 prime, composite, or neither?	1 × 36, 2 × 18, 3 × 12, 4 × 9, 6 × 6; composite
2	Find all factor pairs of 29. Is 29 prime, composite, or neither?	1 × 29; prime
3	Find all factor pairs of 48. Is 48 prime, composite, or neither?	1 × 48, 2 × 24, 3 × 16, 4 × 12, 6 × 8; composite
4	Find all factor pairs of 49. Is 49 prime, composite, or neither?	1 × 49, 7 × 7; composite
5	Find all factor pairs of 64. Is 64 prime, composite, or neither?	1 × 64, 2 × 32, 4 × 16, 8 × 8; composite
6	Find all factor pairs of 97. Is 97 prime, composite, or neither?	1 × 97; prime

PART 2 • APPLY IT

- 1 × 24, 2 × 12, 3 × 8, 4 × 6; composite** List the pairs of whole numbers that multiply to 24. Since 24 has more than two factors, it is composite.
- 1 × 37; prime** Only 1 and 37 multiply to make 37. Since it has exactly two factors, 37 is prime.

CHALLENGE

No. $7 \times 13 = 91$, so 91 is composite.

Accept factor pairs written in either order, such as 2×18 or 18×2 . Students should list each unique pair once and correctly classify the number.