LESSON MAKER PRO

# 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

For whole numbers greater than 1, a prime has exactly two positive factors, 1 and itself; a composite has more than two positive factors. Zero and one are neither prime nor composite. A factor pair multiplies to the given number.

## WORKED EXAMPLE

Find all factor pairs of 72. Then classify 72.

1. Start with 1: 1 × 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** List the positive factor pair for 1. Classify both 0 and 1 as prime, composite or neither, and explain.

**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

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.

WORK SPACE AND ANSWER

**ANSWER KEY**

# Factor Detective Files

**GRADE 4 · MA.4.AR.3.1**

## 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 | List the positive factor pair for 1. Classify both 0 and 1 as prime, composite or neither, and explain. | **1 × 1 is the positive factor pair for 1. Both 0 and 1 are neither: prime and composite numbers must be greater than 1.** |

## PART 2 · APPLY IT

1. **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.
2. **1 × 37; prime** Only 1 and 37 multiply to make 37. Since it has exactly two factors, 37 is prime.

## CHALLENGE

**No. 7 × 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.