LESSON MAKER PRO

Pattern Rule Detectives

Find the rule, then follow the pattern.

GRADE 4 · 4.PFA.1

4.PFA.1 "The student will identify, describe, extend, and create increasing and decreasing patterns (limited to addition, subtraction, and multiplication of whole numbers), including those in context, using various representations. Identify..."

NAME _____ DATE _____

FOLLOW ONE RULE

A pattern rule tells how each number changes. Look for one operation that repeats, such as adding, subtracting, or multiplying by the same whole number.

WORKED EXAMPLE

An input/output table follows one rule. Find the outputs for inputs 4, 12, and 20 when the rule is add 8.

1. Start with input 4.
2. Add 8: 4 + 8 = 12.
3. Add 8 again: 12 + 8 = 20.
4. Add 8 again: 20 + 8 = 28.

Answer: Rule: add 8. Outputs: 12, 20, 28.

PRACTICE 6 problems

1 Write the rule and the next two terms: 5, 11, 17, ___, ___.

ANSWER _____

2 Write the rule and the next two terms: 45, 36, 27, ___, ___.

ANSWER _____

3 Write the rule and the next two terms: 2, 6, 18, ___, ___.

ANSWER _____

4 Find the rule and complete the table. Input | Output 15 | 24 18 | 27 22 | ___

ANSWER _____

5 A function machine subtracts 5. Complete the machine: 63 -> 58, 53 -> ___, 41 -> ___.

ANSWER _____

6 A number line has equal jumps and lands on 70, 77, ___, 91. What is the rule, and what number is missing?

ANSWER _____

APPLY IT Show your work

1 In a video game, Nia earns 14 more coins at each new level. She has 19 coins, then 33 coins, then 47 coins. How many coins will she have at the next two levels? Write the rule.

WORK SPACE

ANSWER _____

2 A school club badge scanner gives 5 points for each badge scanned. Complete the table. Badges | Points 7 | 35 11 | 55 13 | ___ 18 | ___

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A mystery machine has these pairs: 9 -> 54 and 11 -> 66. Complete 14 -> ___ and ___ -> 102. What is the rule? Explain how you know.

_____

_____

ANSWER KEY

Pattern Rule Detectives

GRADE 4 · 4.PFA.1

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Write the rule and the next two terms: 5, 11, 17, ___, ___.	**Rule: add 6. Next terms: 23, 29.**
2	Write the rule and the next two terms: 45, 36, 27, ___, ___.	**Rule: subtract 9. Next terms: 18, 9.**
3	Write the rule and the next two terms: 2, 6, 18, ___, ___.	**Rule: multiply by 3. Next terms: 54, 162.**
4	Find the rule and complete the table. Input | Output 15 | 24 18 | 27 22 | ___	**Rule: add 9. Missing output: 31.**
5	A function machine subtracts 5. Complete the machine: 63 -> 58, 53 -> ___, 41 -> ___.	**Missing outputs: 48, 36.**
6	A number line has equal jumps and lands on 70, 77, ___, 91. What is the rule, and what number is missing?	**Rule: add 7. Missing number: 84.**

PART 2 · APPLY IT

1. **Rule: add 14. Nia will have 61 coins, then 75 coins.** Add 14 to 47 to get 61, then add 14 again to get 75.
2. **Rule: multiply by 5. Missing points: 65, 90.** Multiply each input by 5. Thirteen badges give 65 points, and 18 badges give 90 points.

CHALLENGE

Rule: multiply by 6. 14 -> 84, and 17 -> 102. Each output is 6 times its input.

Accept rule descriptions written in words, such as “add 6,” or with operation symbols. For the challenge, accept an explanation that correctly connects each output to multiplying the input by 6.