LESSON MAKER PRO

Pattern Rule Detectives

Find the change, then use the rule.

GRADE 4 · 4.PFA.1.b

4.PFA.1.b "Analyze an increasing or decreasing single-operation numerical pattern found in lists, input/output tables, or function machines and generalize the change to identify the rule, extend the pattern, or identify missing terms."

NAME _____ DATE _____

FIND THE CHANGE

A numerical pattern changes by the same operation each time. Compare terms that are next to each other to find the amount added or subtracted. Then use that rule to fill in missing terms or extend the pattern.

WORKED EXAMPLE

Use the function machine table. What is the output when the input is 19?

FUNCTION MACHINE

Input	Output
4	13
8	17
13	22

1. 13 - 4 = 9.
2. 17 - 8 = 9, so the rule is add 9.
3. 19 + 9 = 28.

Answer: 28

PRACTICE 6 problems

1 Write the missing term: 46, 52, 58, 64, ___.

ANSWER _____

2 The pattern is 95, 88, 81, ___. Write the next term and the rule.

ANSWER _____

3 A function machine follows one rule: 25 → 30, 37 → 42, 49 → ___. What is the missing output?

ANSWER _____

4 Write the missing term: 63, ___, 49, 42.

ANSWER _____

5 Write the missing term: 18, 27, 36, ___, 54.

ANSWER _____

6 Write the next term: 83, 76, 69, ___.

ANSWER _____

APPLY IT Show your work

1 Maya earns tickets at a game club. She earns 35 tickets on Monday, 40 on Tuesday, and 45 on Wednesday. If the pattern continues, how many tickets will she earn on Thursday and Friday?

WORK SPACE

ANSWER _____

2 At an arcade, a bonus meter shows 92 points after Round 1, 84 points after Round 2, and 76 points after Round 3. If the pattern continues, what will the meter show after Rounds 4 and 5?

WORK SPACE

ANSWER _____

CHALLENGE One step up

A function machine follows one rule: 26 → 33, ___ → 47, 58 → 65. What is the missing input? Explain how you found it.

WORK SPACE AND ANSWER

ANSWER KEY

Pattern Rule Detectives

GRADE 4 · 4.PFA.1.b

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Write the missing term: 46, 52, 58, 64, ___.	**70**
2	The pattern is 95, 88, 81, ___. Write the next term and the rule.	**74; subtract 7**
3	A function machine follows one rule: 25 → 30, 37 → 42, 49 → ___. What is the missing output?	**54**
4	Write the missing term: 63, ___, 49, 42.	**56**
5	Write the missing term: 18, 27, 36, ___, 54.	**45**
6	Write the next term: 83, 76, 69, ___.	**62**

PART 2 · APPLY IT

1. **50 tickets on Thursday and 55 tickets on Friday.** The number of tickets increases by 5 each day. Add 5 to 45, then add 5 again.
2. **68 points after Round 4 and 60 points after Round 5.** The meter decreases by 8 points each round. Subtract 8 twice from 76.

CHALLENGE

40; the rule is add 7, so 47 - 7 = 40.

Accept equivalent wording for the rules, such as "take away 7" for "subtract 7." For the challenge, students should identify the add 7 rule and use subtraction to find the missing input.