

Pattern Power Path

Find the change, then keep the pattern going.

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 amount each time. Compare nearby numbers to find whether the pattern adds or subtracts. Use the same change to fill blanks or extend the pattern.

WORKED EXAMPLE

Pattern: 8, 15, 22, 29, _____. What comes next?

1. $15 - 8 = 7$.
2. $22 - 15 = 7$.
3. $29 - 22 = 7$.
4. Add 7 to 29: $29 + 7 = 36$.

Answer: The rule is add 7 each time. The next number is 36.

PRACTICE 6 problems

- 1** Pattern: 6, 12, 18, ____, ____. What is the rule? Fill in both blanks.

ANSWER _____

- 2** Pattern: 81, 72, ____, 54. Fill in the blank and name the rule.

ANSWER _____

- 3** Input | Output 1 | 14 5 | 18 11 | ____ What single operation changes each input to its output? Fill in the blank.

ANSWER _____

- 4** Function machine: $69 \rightarrow 64 \rightarrow 59 \rightarrow$ _____. What is the rule?

ANSWER _____

- 5** Pattern: 95, 85, 75, ____, 55. What number is missing?

ANSWER _____

- 6** Function machine rule: subtract 16. Input: 63. Output: ____.

ANSWER _____

APPLY IT Show your work

- 1** Maya has 47 points after round one of a video game tournament. She earns 12 more points after each later round. Write her score after each round through round four. What is her score after round four?

WORK SPACE

ANSWER _____

- 2** The school library has 96 new comic bookmarks. For three days, students take 14 bookmarks each day. Write the number of bookmarks left at the end of each day. How many are left after three days?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A robot follows one rule for this pattern: __, 73, 61, __, 37. Fill in both blanks. Explain how you know the rule.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Pattern: 6, 12, 18, __, __. What is the rule? Fill in both blanks.	Add 6 each time; 24, 30.
2	Pattern: 81, 72, __, 54. Fill in the blank and name the rule.	63; subtract 9 each time.
3	Input Output 1 14 5 18 11 __ What single operation changes each input to its output? Fill in the blank.	Add 13; 24.
4	Function machine: $69 \rightarrow 64 \rightarrow 59 \rightarrow \underline{\hspace{1cm}}$. What is the rule?	Subtract 5 each time; 54.
5	Pattern: 95, 85, 75, __, 55. What number is missing?	65.
6	Function machine rule: subtract 16. Input: 63. Output: __.	47.

PART 2 • APPLY IT

- 47, 59, 71, 83; 83 points.** Start with 47 and add 12 for each new round. The scores are 47, 59, 71, and 83.
- 82, 68, 54; 54 bookmarks.** Subtract 14 each day from 96. The amounts left are 82, 68, and 54.

CHALLENGE

85, 49. The rule is subtract 12 each time because 73 to 61 is 12 less.

Accept equivalent rule language, such as “go up by 6” for “add 6 each time.” For the challenge, accept any explanation that correctly identifies subtracting 12 and supports both missing terms.