LESSON MAKER PRO

Pattern Rule Detectives

Find the rule, then extend the pattern.

GRADE 4 · 4.PFA.1.d

4.PFA.1.d "Solve contextual problems that involve identifying, describing, and extending increasing and decreasing patterns using single-operation input and output rules."

NAME _____ DATE _____

ONE RULE EACH TIME

An input-output rule tells what to do to each input. Use the same one operation every time, such as adding, subtracting, multiplying, or dividing. Check the rule with each number before you extend the pattern.

WORKED EXAMPLE

The rule is add 3. Complete the output for input 12.

INPUT AND OUTPUT

Input	Output
6	9
9	12
12	___

1. Start with the input 12.
2. Add 3: 12 + 3 = 15.
3. Write 15 as the output.

Answer: 15

PRACTICE 6 problems

1 Rule: add 4. The input is 7. What is the output?

ANSWER _____

2 Rule: subtract 5. The input is 18. What is the output?

ANSWER _____

3 This pattern is decreasing: 41, 34, 27, 20, ___. What number comes next? Write the rule.

ANSWER _____

4 A rule multiplies each input by 4. What output matches an input of 7?

ANSWER _____

5 The output rule is divide by 2. The input is 36. What is the output?

ANSWER _____

6 Rule: add 8. The output is 31. What input gives that output?

ANSWER _____

APPLY IT Show your work

1 At a game booth, each game earns 7 prize tickets. Mia plays 2 games on Saturday and 4 games on Sunday. How many tickets does she earn each day? Write the input-output rule.

WORK SPACE

ANSWER _____

2 A reading app shows 50 pages left in a book. Sam reads 8 pages each day. How many pages are left after 1 day, 2 days, and 4 days? Describe the decreasing rule.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A mystery machine uses one operation. Input 5 gives output 35, input 8 gives output 56, and input 11 gives output 77. What output does input 13 give? Explain the rule.

WORK SPACE AND ANSWER

ANSWER KEY

Pattern Rule Detectives

GRADE 4 · 4.PFA.1.d

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Rule: add 4. The input is 7. What is the output?	**11**
2	Rule: subtract 5. The input is 18. What is the output?	**13**
3	This pattern is decreasing: 41, 34, 27, 20, ___. What number comes next? Write the rule.	**13; subtract 7 each time**
4	A rule multiplies each input by 4. What output matches an input of 7?	**28**
5	The output rule is divide by 2. The input is 36. What is the output?	**18**
6	Rule: add 8. The output is 31. What input gives that output?	**23**

PART 2 · APPLY IT

1. **Saturday: 14 tickets; Sunday: 28 tickets; multiply the number of games by 7** Multiply each number of games by 7. Two games earn 14 tickets, and four games earn 28 tickets.
2. **After 1 day: 42 pages; after 2 days: 34 pages; after 4 days: 18 pages; subtract 8 for each day** Subtract 8 pages for each day read. The pages left decrease by 8 each day.

CHALLENGE

91; multiply each input by 7

Accept equivalent rule wording, such as “plus 4,” “take away 5,” “times 7,” or “divide by 2.” For written rules, require the correct operation and number.