LESSON MAKER PRO

Pattern Power

Find the rule, then keep it going.

GRADE 5 · 5.PFA.1

5.PFA.1 "The student will identify, describe, extend, and create increasing and decreasing patterns with whole numbers, fractions, and decimals, including those in context, using various representations. Identify, describe, extend..."

NAME _____ DATE _____

SPOT THE REPEATING CHANGE

Compare neighboring terms or input-output pairs. Look for one operation that repeats, such as adding the same amount, subtracting the same amount, multiplying, or dividing. Use that same operation to extend the pattern or fill in a missing value.

WORKED EXAMPLE

Find the rule and the next term: 1.11, 1.24, 1.37, 1.50, ___

1. 1.24 - 1.11 = 0.13.
2. 1.37 - 1.24 = 0.13.
3. The pattern adds 0.13 each time.
4. 1.50 + 0.13 = 1.63.

Answer: Add 0.13; 1.63.

PRACTICE 6 problems

1 Fill in the next two terms. Then write the rule: 14, 21, 28, __, __

ANSWER _____

2 Fill in the next two terms. Then write the rule: 144, 72, 36, __, __

ANSWER _____

3 Fill in the next two terms. Then write the rule: 3/10, 5/10, 7/10, __, __

ANSWER _____

4 Fill in the next two terms. Then write the rule: 2.80, 2.55, 2.30, __, __

ANSWER _____

5 A function machine gives these pairs: 6 goes to 24, 8 goes to 32, and 10 goes to 40. What is the rule? What output does 13 give?

ANSWER _____

6 A function machine gives these pairs: 65 goes to 49 and 58 goes to 42. What is the rule? What does 71 go to?

ANSWER _____

APPLY IT Show your work

1 In a video game, you earn the same number of tickets for each level you finish. Use the table. How many tickets will you have after 8 levels? State the rule.

GAME TICKETS

Levels Finished	Tickets Earned
1	5
3	15
5	25

ANSWER

2 Ravi has 11/12 yard of ribbon. Each badge uses 2/12 yard. Complete 11/12, 9/12, 7/12, ___, ___. Then create four decreasing fractions with denominator 12 and state your subtraction rule.

CHALLENGE One step up

A robot-building game uses the same input-output rule for every row. Fill in the missing input and output. Then explain how you know the rule works for all the rows.

ROBOT CARD POINTS

Input	Output
4	28
7	49
	63
11	

WORK SPACE AND ANSWER

ANSWER KEY

Pattern Power

GRADE 5 · 5.PFA.1

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Fill in the next two terms. Then write the rule: 14, 21, 28, __, __	**35, 42; add 7 each time.**
2	Fill in the next two terms. Then write the rule: 144, 72, 36, __, __	**18, 9; divide by 2 each time.**
3	Fill in the next two terms. Then write the rule: 3/10, 5/10, 7/10, __, __	**9/10, 11/10; add 2/10 each time.**
4	Fill in the next two terms. Then write the rule: 2.80, 2.55, 2.30, __, __	**2.05, 1.80; subtract 0.25 each time.**
5	A function machine gives these pairs: 6 goes to 24, 8 goes to 32, and 10 goes to 40. What is the rule? What output does 13 give?	**Multiply the input by 4; 52.**
6	A function machine gives these pairs: 65 goes to 49 and 58 goes to 42. What is the rule? What does 71 go to?	**Subtract 16 from the input; 55.**

PART 2 · APPLY IT

1. **40 tickets; multiply the number of levels by 5.** Each ticket total is 5 times the number of levels. Multiply 8 by 5 to get 40.
2. **5/12, 3/12; subtract 2/12 each time. Created examples vary: 12/12, 9/12, 6/12, 3/12; subtract 3/12 each time.** Subtract 2/12 from each amount of ribbon. After 7/12, the amounts are 5/12 and then 3/12. Check four terms and one repeated subtraction rule; every term must follow the stated rule.

CHALLENGE

Rule: multiply the input by 7. Missing input: 9. Missing output: 77. The known outputs are each 7 times their inputs.

Accept 11/10 or 1 1/10 in problem 3. Accept equivalent fraction forms when they represent the same amount, along with a correct repeated-operation rule.