LESSON MAKER PRO

Term by Term

Use a rule repeatedly to build a sequence.

HIGH SCHOOL · FM.R.A

FM.R.A "Recursion is a method of problem solving where a given relation or routine operation is repeatedly applied."

NAME _____ DATE _____

THE RECURSIVE RULE

A recursive rule uses one term to make the next term. Start with the given first term and apply the rule one step at a time. To work backward, undo the operations in reverse order.

WORKED EXAMPLE

Let $a_1 = 13$. To get each new term, multiply the previous term by 5, then subtract 8. Find a_3.

1. Start with $a_1 = 13$.
2. $a_2 = 5(13) - 8 = 57$.
3. $a_3 = 5(57) - 8 = 277$.

Answer: $a_3 = 277$

PRACTICE 6 problems

1 Let $a_1 = 2$. Add 7 to get each new term. Find a_4.

ANSWER _____

2 Let $a_1 = 40$. Subtract 6 to get each new term. Find a_4.

ANSWER _____

3 Let $a_1 = 3$. To get each new term, double the previous term, then add 1. Find a_4.

ANSWER _____

4 Let $a_1 = 96$. Divide by 2 to get each new term. Find a_4.

ANSWER _____

5 Each term is twice the previous term minus 3. If $a_3 = 23$, find a_1.

ANSWER _____

6 Let $a_1 = 46$. To get each new term, divide the previous term by 2, then add 1. Find a_2 and a_4.

ANSWER _____

APPLY IT Show your work

1 You save $18 for a concert ticket in week 1. Each week after that, you save $6 more than you saved the week before. How much do you save in week 4, and how much do you save in all four weeks?

WORK SPACE

ANSWER _____

2 Your phone has 140 saved videos. Each week, you delete half the videos you had at the start of the week, then save 10 new videos. How many saved videos are on your phone after 3 weeks?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Each term is twice the previous term minus 7. If $a_4 = 71$, find a_1. Explain how you worked backward.

WORK SPACE AND ANSWER

Term by Term

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Let $a_1 = 2$. Add 7 to get each new term. Find a_4.	**$a_4 = 23$**
2	Let $a_1 = 40$. Subtract 6 to get each new term. Find a_4.	**$a_4 = 22$**
3	Let $a_1 = 3$. To get each new term, double the previous term, then add 1. Find a_4.	**$a_4 = 31$**
4	Let $a_1 = 96$. Divide by 2 to get each new term. Find a_4.	**$a_4 = 12$**
5	Each term is twice the previous term minus 3. If $a_3 = 23$, find a_1.	**$a_1 = 8$**
6	Let $a_1 = 46$. To get each new term, divide the previous term by 2, then add 1. Find a_2 and a_4.	**$a_2 = 24$; $a_4 = 15/2$**

PART 2 · APPLY IT

1. **$36 in week 4; $108 in all** The weekly amounts are $18, $24, $30, and $36. Add the four amounts to get $108.
2. **35 videos** Apply the rule three times: 140 becomes 80, then 50, then 35.

CHALLENGE

$a_1 = 15$. Add 7 and divide by 2 at each step: 71 becomes 39, then 23, then 15.

Accept 7.5 for 15/2 in Problem 6. For the challenge, accept any explanation that correctly reverses the rule three times.