

9.4 Sequences & Series

Target 7C: Generate and identify the explicit rule for geometric sequences

*Review of Prior Concepts***Is the sequence arithmetic? If yes, find the common difference.**

- a) 1,5,9,13,17, ...
- b) 1,4,9,16,25, ...
- c) $4x, x, -2x, -5x, -8x, \dots$

More Practice

Arithmetic Sequences

<https://www.mathsisfun.com/algebra/sequences-sums-arithmetic.html><https://www.khanacademy.org/math/algebra/sequences/constructing-arithmetic-sequences/a/writing-recursive-formulas-for-arithmetic-sequences>http://www.algebra-lab.org/lessons/lesson.aspx?file=algebra_arithseq.xml<http://www.coolmath.com/algebra/19-sequences-series/05-arithmetic-sequences-01>https://youtu.be/cooC3yG_p0https://youtu.be/lj_X9JVSF8k

SAT Connection

Passport to Advanced Math**10.** Interpret parts of nonlinear expressions in terms of their context

Example:

Jessica opened a bank account that earns 2 percent interest compounded annually. Her initial deposit was \$100, and she uses the expression $\$100(x)^t$ to find the value of the account after t years.

What is the value of x in the expression?

/	○	○		
.	○	○	○	○
0	○	○	○	○
1	○	○	○	○
2	○	○	○	○
3	○	○	○	○
4	○	○	○	○
5	○	○	○	○
6	○	○	○	○
7	○	○	○	○
8	○	○	○	○
9	○	○	○	○

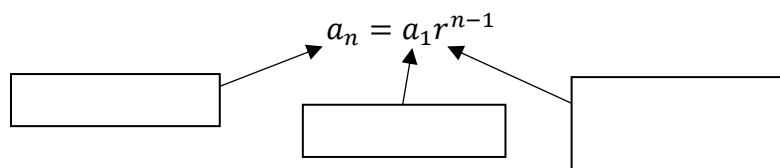
NOTE: You may start your answers in any column, space permitting. Columns you don't need to use should be left blank.

Solution

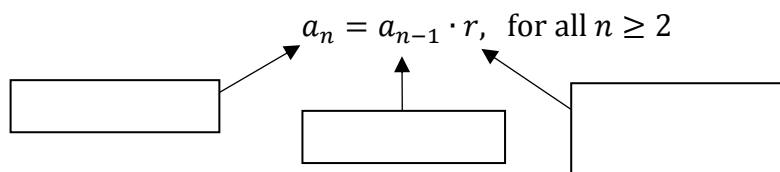
Geometric Sequence

Geometric Sequence – sequence written as $\{a, ar, ar^2, ar^3, \dots, ar^{n-1}, \dots\}$

Explicit Rule



Recursive Rule



Example 1: Find the common ratio and 10th term, and write a recursive rule and explicit rule for the sequence: 9, 18, 36, 72, ...

Example 2: Find the common ratio and 10th term, and write a recursive rule and explicit rule for the sequence: 7, 0.7, 0.07, 0.007, ...

Example 3: Given $a_3 = \frac{1}{2}$ and $a_5 = \frac{9}{2}$, find a_1 .

Example 4: The fifth and eighth terms of a geometric sequence are 1920 and 30, respectively, find a_1 .

Example 5: A population of ants is growing at a rate of 8% a year. If there are 160 ants in the initial population, find the number of ants after 6 years.

Example 6: Find which term in the geometric sequence 1, 3, 9, 27, ... is the first to exceed 7,000.

More Practice

Geometric Sequences

<http://www.mathsisfun.com/algebra/sequences-sums-geometric.html>

http://www.algebra-lab.org/lessons/lesson.aspx?file=algebra_geoseq.xml

<http://www.mathguide.com/lessons/SequenceGeometric.html>

<https://youtu.be/EJjCXIhP7X0>

<https://youtu.be/h1HJEOD6u8E>

<https://youtu.be/C7tE26CDI2M>

https://youtu.be/cXy_LJK0Ui8

https://youtu.be/lj_X9JVSF8k

Homework Assignment

p.746 #15,17,21,27–37odd

SAT Connection**Solution**

The correct answer is 1.02. The initial deposit earns 2 percent interest compounded annually. Thus at the end of 1 year, the new value of the account is the initial deposit of \$100 plus 2 percent of the initial deposit: $\$100 + \frac{2}{100}(\$100) = \$100(1.02)$. Since the interest is compounded annually, the value at the end of each succeeding year is the sum of the previous year's value plus 2 percent of the previous year's value. This is again equivalent to multiplying the previous year's value by 1.02. Thus, after 2 years, the value will be $\$100(1.02)(1.02) = \$100(1.02)^2$; after 3 years, the value will be $\$100(1.02)^3$; and after t years, the value will be $\$100(1.02)^t$. Therefore, in the formula for the value for Jessica's account after t years, $\$100(x)^t$, the value of x must be 1.02.