

WARM UP

Fill in the formulas for arithmetic sequences and series. Then, write the formulas in your own words. This will be the first problem for tonight's homework, so you can label your paper "8.3."

$$a_n = a_1 + (n-1)d$$

$$S_n = \frac{n}{2}(a_1 + a_n)$$

Apr 17-11:04 AM

Questions ⁸³ over 8.2?

$$a_1 = 20,000 \quad a_5 =$$

$$a_n = a_1 + (n-1)d$$

$$a_5 = 20,000 + (5-1)(5,000)$$

$$a_5 = 20,000 + 4(5,000)$$

$$= 40,000$$

$$S_5 = \frac{5}{2}(20,000 + 40,000)$$

$$S_5 = \$150,000$$

Apr 8-3:31 PM

Pattern Recognition!

Try to figure out both the recursive and the general formula for each of the following sequences.

$\{2, 4, 8, 16, 32, 64, \dots\}$
 $\times 2$ $a_{k+1} = 2a_k$ $a_n = 2(2)^{n-1}$

$\{\frac{1}{3}, \frac{1}{9}, \frac{1}{27}, \frac{1}{81}, \dots\}$
 $\times \frac{1}{3}$ $a_{k+1} = \frac{1}{3}a_k$ $a_n = \frac{1}{3}(\frac{1}{3})^{n-1}$

$\{5, 50, 500, 5000, \dots\}$

$\{16, -8, 4, -2, 1, -\frac{1}{2}, \dots\}$
 $\times -\frac{1}{2}$ $a_k = -\frac{1}{2}a_{k-1}$ $a_n = 16(-\frac{1}{2})^{n-1}$

p. 607: #1, 11 (HW)

Feb 27-8:06 AM

Arithmetic = Add a common difference, d, to find the next term

Geometric = Multiply a common ratio, r, to find the next term

$$r = \frac{2nd}{1st}$$

$$= \frac{3rd}{2nd}$$

$$a_{n+1} = r a_n$$

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Finding a formula for a_n ...

a_1

$a_2 = a_1 \cdot r^1$

$a_3 = a_1 \cdot r^2$

$a_4 = a_1 \cdot r^3$

The n th term of a geometric sequence is given by $a_n = a_1 \cdot r^{n-1}$ for any integer $n \geq 1$.

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Example

Find a formula for a_n given $a_1 = 2$ and $r = -3$.
Then find the 4th term.

$a_n = 2(-3)^{n-1}$

$a_4 = 2(-3)^{4-1}$
 $a_4 = 2(-3)^3$
 $a_4 = -54$

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Example

Find the indicated term.
2, 4, 8, 16, ...; the 7th term

$\frac{4}{2} = 2$ $\frac{8}{4} = 2$

$a_n = 2(2)^{n-1}$

$a_7 = 2(2)^{7-1}$
 $= 2(2)^6$
 $= 128$

p. 607, #33 (HW)

Apr 17-11:10 AM

Find the 7th term given $a_3 = \frac{16}{3}$ and $a_5 = \frac{64}{27}$

$a_5 = a_3 \cdot r^2$

$\left(\frac{3}{16}\right) \frac{64}{27} = \frac{16}{3} \cdot r^2 \left(\frac{3}{16}\right)$

$\frac{4}{9} = r^2$

$\pm \frac{2}{3} = r$

$a_n = a_1 \cdot r^{n-1}$

$a_3 = a_1 \cdot r^2$

$\frac{16}{3} = a_1 \left(\pm \frac{2}{3}\right)^2$

$\left(\frac{9}{4}\right) \frac{16}{3} = a_1 \left(\frac{4}{9}\right) \left(\frac{9}{4}\right)$

$12 = a_1$

$a_n = 12 \left(\pm \frac{2}{3}\right)^{n-1}$

$a_7 = 12 \left(\pm \frac{2}{3}\right)^{7-1}$
 $= 12 \left(\frac{64}{729}\right)$
 $= \frac{768}{729}$

$a_7 = \frac{256}{243}$

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HOMEWORK

...geometric=multiply

Due Monday

8.3 (p. 607): 1-23 (1, 3, 5's); 27-35 (odd);

41, 45, 49, 55-58 (all) 59, 63, 69, 71, 77, 79

Apr 8-3:29 PM