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Sequences Review

9.2-9.3

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Write these sequences below in your notebooks!

Indicate whether the following is an ARITHMETIC sequence or a GEOMETRIC sequence (circle one). If it is arithmetic, indicate the common difference, d . If it is geometric, indicate the common ratio, r .

1) -6, 12, -24, 48, ... Arithmetic Geometric $d / r = \underline{-2}$

2) -10, -8, -6, -4, ... Arithmetic / Geometric $d / r = \underline{2}$

3) 1, 3, 9, 27, ... Arithmetic Geometric $d / r = \underline{3}$

4) 72, 48, 24, 12, ... Arithmetic / Geometric $d / r = \underline{\text{Neither}}$

Explicit Formulas
Arithmetic Sequence

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

Geometric Sequence

$$a_n = a_1(r)^{(n-1)}$$

Find the 18th term of each arithmetic sequence.

1. 5, 9, 13, 17, ...

$$a_1 = 5$$

$$d = 4$$

$$a_{18} = 5 + (18-1)(4) = 73$$

2. 4, 1, -2, -5, ...

$$a_1 = 4$$

$$d = -3$$

$$a_{18} = 4 + (18-1)(-3) = -47$$

Use the arithmetic mean to find the missing term in each arithmetic sequence.

3. ...6, , 28, ...

$$\frac{(6+28)}{2} = 17$$

4. ...2, , -14, ...

$$\frac{(2+(-14))}{2} = -6$$

5. ...1.4, , 6.8, ...

$$\frac{(1.4+6.8)}{2} = 4.1$$

Missing Term
Arithmetic
 a, b, c
 $\frac{(a+c)}{2}$

Explicit Formulas

Arithmetic Sequence

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

Geometric Sequence

$$a_n = a_1(r)^{(n-1)}$$

Find the eighth term of each geometric sequence.

6. 2, 6, 18, ...

$$r = 3$$

$$a_1 = 2$$

$$a_8 = 2(3)^{(8-1)} = \boxed{4374}$$

7. -7, 21, -63, ...

$$r = -3$$

$$a_1 = -7$$

$$a_8 = -7(-3)^{(8-1)} = \boxed{15,309}$$

Find the missing term of each geometric sequence. It could be the geometric mean or its opposite.

8. 2, $\boxed{12}$, 72, ...

$$\sqrt{(2 \cdot 72)}$$

9. 175, $\boxed{35}$, 7, ...

$$\sqrt{(175 \cdot 7)}$$

10. 1.2, $\boxed{7.2}$, 43.2, ...

$$\sqrt{(1.2 \cdot 43.2)}$$

Missing Term
Geometric
a, b, c
 $\sqrt{(a \cdot c)}$

Applications Examples

$$d=12 \quad a_1=12$$

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1. Tim takes the stairs up to his office. He enters the ground floor of the building and climbs 12 steps to reach the first floor. He climbs a total of 24 steps to reach the second floor and 36 steps to reach the third floor. How many steps will Tim climb to reach his office on the 16th floor?

Explicit Formula $a_n = 12 + (n-1)(12)$ 12, 24, 36, 48, 60

16th term? $a_{16} = 12 + (16-1)(12) = 192$ steps

2. The bacteria population in a petri dish was 14 at the beginning of an experiment. After 30 min, the population was 28, and after an hour the population was 56.
- Write an explicit definition to represent this sequence.
 - If this pattern continues, what will be the bacteria population after 4 h?

$$a_1 = 14$$

$$r = 2$$

$$14, 28, 56, 112, 224$$

$$a_n = 14(2)^{n-1}$$

$$a_8 = 14(2)^{(8-1)} = 1792 \text{ bacteria}$$

Practice Time:

Sequences Review - Due tomorrow

Quiz tomorrow! You may use your notes on the quiz