

TOPIC: GEOMETRIC SEQUENCES

Intro to Geometric Sequences

EXAMPLE

Find the pattern for each sequence of numbers.

(A) 2, 4, 6, 8...

(B) 2, 4, 8, 16...

(C) 9, 3, 1, $\frac{1}{3}$, ...

◆ If each term in a sequence is found by _____ by the same number, we call it a **geometric sequence**.

► The **common ratio** r is the constant multiplier between any two consecutive terms.

New
 $r = \text{---}$

EXAMPLE

Find the common ratio of the geometric sequence and then use it to find the next two terms.

$$a_1 = 5, a_2 = 20$$

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PRACTICE

Identify if each sequence is arithmetic, geometric, or neither.

(A) 7, 10, 16, 25, 37, ...

[ARITHMETIC | GEOMETRIC | NEITHER]

(B) 5, 11, 17, 23, 29, ...

[ARITHMETIC | GEOMETRIC | NEITHER]

(C) $10, 5, \frac{5}{2}, \frac{5}{4}, \dots$

[ARITHMETIC | GEOMETRIC | NEITHER]

PRACTICE

Find the common ratio for the geometric sequence.

(A) 3, 12, 48, 192, ...

(B) $\frac{18}{5}, \frac{6}{5}, \frac{2}{5}, \frac{2}{15}, \dots$

(C) 0.8, 0.12, 0.018, 0.0027, ...

PRACTICE

Find the common ratio for the geometric sequence.

$6, -3\sqrt{2}, 3, -\frac{3\sqrt{2}}{2}, \dots$

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PRACTICE

Write the first four terms of the following geometric sequence.

(A) $a_1 = -8, r = -\frac{1}{2}$

(B) $a_1 = \frac{3}{4}, r = \frac{2}{3}$

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General Term of a Geometric Sequence

◆ Recall: The terms of a geometric sequence have a common ratio r between any two consecutive terms.

► The general (n th) term a_n of a geometric sequence is based on ____ (the ____ term) & ____.

NewGeneral Term of Geometric Sequences

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

$$\{3, 6, 12, 24, \dots\}$$

$a_1 =$ $a_2 =$ $a_3 =$ $a_4 =$

$a_n =$ $a_{20} =$

EXAMPLE

Write a formula for the general or n^{th} term for each geometric sequence.

(A) $a_1 = 8, r = 3$

(B) $\frac{16}{27}, \frac{8}{9}, \frac{3}{4}, 2, \dots$

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PRACTICE

Write a formula for the general or n^{th} term for each geometric sequence.

(A) $12, -6, 3, -\frac{3}{2}, \dots$

(B) $0.8, 0.32, 0.128, 0.0512, \dots$

PRACTICE

Find the indicated term of the following geometric sequence.

(A) $a_n = 10 \left(\frac{1}{5}\right)^{n-1}$
Find a_4 .

(B) $a_n = 4(0.3)^{n-1}$
Find a_5 .

EXAMPLE

Find the common ratio, and the fifth term (a_5) for the geometric sequence.

$$a_3 = 6$$

$$a_6 = \frac{3}{4}$$

EXAMPLE

A certain medicine decreases in the bloodstream by 20% each hour after it is taken. Right after taking the dose, a patient has 80 mg of the medication in their system. How much of it is remaining after 5 hours? Approximate to the nearest tenths.