

C9L2 Notes

Geometric Sequences

Find the missing number(s) of the geometric sequence.

1. 1, 5, 25, 125, 625, 3125

2. 1, -4, 16, -64, 256

State the next fraction in the sequence. Simplify if possible.

3. $\frac{1}{3}, \frac{1}{9}, \frac{1}{27}, \frac{1}{81}, \dots$ $\frac{1}{243}$

4. $\frac{2}{5}, \frac{-4}{25}, \frac{8}{125}, \frac{-16}{625}, \dots$ $\frac{32}{3125}$

Formula for an arithmetic sequence: $a_n = a_1 (r)^{n-1}$

a_n = value of the nth term

a_1 = initial term

n = numbered position of the term in the sequence

r = common ratio

Write an expression to describe the sequence below. Use n to represent the position of a term in the sequence, where $n = 1$ for the first term.

5. -3, -12, -48, ... $\frac{r}{-12 = -3} = 4$
 $-3(4)^{n-1}$

6. -1.2, 2.4, -4.8, ... $\frac{r}{2.4 = -1.2} = -2$
 $-1.2(-2)^{n-1}$

7. $\frac{4}{27}, \frac{2}{9}, \frac{1}{3}, \dots$ $\frac{r}{\frac{2}{9} \div \frac{4}{27}} = \frac{2}{9} \cdot \frac{27}{4} = \frac{3}{2}$
 $\frac{4}{27} \left(\frac{3}{2}\right)^{n-1}$

8. $\frac{-13}{21}, \frac{52}{63}, \frac{-208}{189}, \dots$ $\frac{r}{\frac{52}{63} \div \frac{-13}{21}} = \frac{52}{63} \cdot \frac{21}{-13} = -\frac{4}{3}$
 $\frac{-13}{21} \left(\frac{-4}{3}\right)^{n-1}$

9. Find the 11th term of the geometric sequence represented by the

equation: $a_n = 7(3)^{n-1}$

$$a_{11} = 7(3)^{11-1}$$

$$a_{11} = 413343$$

10. Find the common ratio of the geometric sequence represented by the

equation: $a_n = -12(0.23)^{n-1}$

$$r = 0.23$$

11. Find the common ratio of the geometric sequence:

$$4, \frac{-4}{3}, \frac{4}{9}, \frac{-4}{27}, \dots$$

$$r: \frac{-4}{3} \div 4 = -\frac{1}{3}$$

$$r = -\frac{1}{3}$$

$$\frac{4}{9} \div \frac{-4}{3} = -\frac{1}{3}$$

12. Find the 17th term of the geometric sequence:

131072, 65536, 32768, 16384, ...

$$a_{17} = 131072 \left(\frac{1}{2}\right)^{17-1}$$

$$a_{17} = 2$$

$$r: \frac{65536}{131072} = \frac{1}{2}$$

$$\frac{32768}{65536} = \frac{1}{2}$$