

Review Exercise Set 16

Exercise 1: Find the common ratio of the geometric sequence.

$$32, 8, 2, \frac{1}{2}, \dots$$

Exercise 2: Write the first five terms of the geometric sequence.

$$a_n = 4(-2)^{n-1}$$

Exercise 3: Write the formula for the nth term.

$$a_1 = \frac{5}{6} \quad r = -3$$

Exercise 4: Find the 20th term of the geometric sequence. (Leave your answer with the exponent on r)

$$54, -36, 24, -16, \dots$$

Exercise 5: Find the sum of the infinite geometric series.

$$8 - 4 + 2 - 1 + \dots$$

Review Exercise Set 16 Answer Key

Exercise 1: Find the common ratio of the geometric sequence.

$$32, 8, 2, \frac{1}{2}, \dots$$

To find the common ratio of a geometric sequence you would divide each term by the term before it.

$$\frac{8}{32} = \frac{1}{4} \quad \frac{2}{8} = \frac{1}{4} \quad \frac{\frac{1}{2}}{2} = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$$

The common ratio is one-fourth (1/4).

Exercise 2: Write the first five terms of the geometric sequence.

$$a_n = 4(-2)^{n-1}$$

$$n = 1 \quad n = 2 \quad n = 3 \quad n = 4 \quad n = 5$$

$$\begin{aligned} a_1 &= 4(-2)^{1-1} & a_2 &= 4(-2)^{2-1} & a_3 &= 4(-2)^{3-1} & a_4 &= 4(-2)^{4-1} & a_5 &= 4(-2)^{5-1} \\ &= 4(-2)^0 & &= 4(-2)^1 & &= 4(-2)^2 & &= 4(-2)^3 & &= 4(-2)^4 \\ &= 4(1) & &= 4(-2) & &= 4(4) & &= 4(-8) & &= 4(16) \\ &= 4 & &= -8 & &= 16 & &= -32 & &= 64 \end{aligned}$$

The first five terms are 4, -8, 16, -32, and 64.

Exercise 3: Write the formula for the nth term.

$$a_1 = \frac{5}{6} \quad r = -3$$

Substitute the given values into the general formula for a geometric sequence.

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

$$a_n = \left(\frac{5}{6}\right)(-3)^{n-1}$$

$$a_n = \frac{5}{6} (-3)^{n-1}$$

Exercise 4: Find the 20th term of the geometric sequence. (Leave your answer with the exponent on r)

$$54, -36, 24, -16, \dots$$

First, find the common ratio

$$r = \frac{-36}{54} = -\frac{2}{3}$$

Now, find the 20th term

$$a_1 = 54; r = -\frac{2}{3}; n = 20$$

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

$$a_{20} = (54)\left(-\frac{2}{3}\right)^{20-1}$$

$$a_{20} = (54)\left(-\frac{2}{3}\right)^{19}$$

Exercise 5: Find the sum of the infinite geometric series.

$$8 - 4 + 2 - 1 + \dots$$

First, find the common ratio

$$r = \frac{-4}{8} = -\frac{1}{2}$$

Now, substitute the first term and common ratio into the formula for the sum of an infinite geometric series.

$$\begin{aligned} S_n &= \frac{a_1}{1-r} \\ &= \frac{8}{1-\left(-\frac{1}{2}\right)} \\ &= \frac{8}{1+\frac{1}{2}} \\ &= \frac{8}{\frac{3}{2}} \\ &= 8 \times \frac{2}{3} \\ &= \frac{16}{3} \end{aligned}$$