

## Geometric Sequences Assignment

The first three terms of a geometric sequence are given. Find the next three terms.

1. 1, 3, 9, ....

2.  $\frac{1}{1000}, \frac{1}{10}, 10$  ....

3. 100, 50, 25, ....

4. 224, 56, 14, ....

Find the common ratio and the 8th term of the following geometric sequence.

5. 2, 4, 8, ....

6. -3, 1,  $\frac{1}{3}$ , ....

Given the first term "a" and common ratio "r", generate the next three terms in a geometric sequence.

7.  $a = 12.3$ ;  $r = 0.5$

8.  $a = -4$ ;  $r = -2$

Find the nth term of the following geometric sequence.

9.  $a = 1$ ;  $r = 3$ ;  $n = 8$

10.  $a = 4$ ;  $r = 2$ ;  $n = 5$

Given the first term, the nth term and the common ratio find the sum of the following geometric sequence.

11.  $a = 3$ ;  $a_5 = 48$ ;  $r = 2$

12.  $a = 2$ ;  $a_8 = 4374$ ;  $r = 3$

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## Geometric Sequences Assignment

Given the first term and the common ratio find the sum of the first 10 terms of the following sequence.

13.  $a = 3; r = 5$

12.  $a = 2; r = -5$

Solve the following problem involving geometric sequences.

13. Find the fourteenth term of a geometric sequence  $\frac{1}{8}, \frac{1}{4}, \frac{1}{2}, \dots$

14. Find the one-hundred first term of the geometric sequence with  $a = 3$  and  $r = -1$ .

15. Find the sum of the first 11 term of a geometric sequence with  $a = 2$  and  $r = -3$

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## Geometric Sequences Assignment

16. If the sum of the first seven terms of a geometric sequence is 547 and the common ratio is -3, find the first term of a sequence.

19. An amount of \$1000 is deposited in an account that pays 6% compounded annually. Find the common ratio and the amount after 4 years.

20. Suppose you have the following: \$1 in the first day, \$2 in the second day, \$4 in the third day, etc. each day saving double of what you save the previous day. How many dollars you would have after 30 days?

# Geometric Sequences Assignment

Answer:

The first three terms of a geometric sequence are given. Find the next three terms.

1. 1, 3, 9, ....

Answers:

27, 81 and 243

2.  $\frac{1}{1000}, \frac{1}{10}, 10$  ....

Answers:

1000, 10000 and 1000000

3. 100, 50, 25, ....

Answers:

12.5, 6.25 and 3.125

4. 224, 56, 14, ....

Answers:

3.5, 0.875 and 0.21875

Find the common ratio and the 8th term of the following geometric sequence.

5. 2, 4, 8, ....

Answers:

Common ratio: 2

$$a_8 = (2)(2)^{8-1} = (2)(2)^7$$

$$= 2(128) = 256$$

6. -3, 1,  $\frac{1}{3}$ , ....

Answers:

Common ratio:  $-\frac{1}{3}$

$$a_8 = (-3)\left(-\frac{1}{3}\right)^{8-1} = (-3)\left(-\frac{1}{3}\right)^7$$

$$= -3\left(-\frac{1}{2187}\right) = \frac{1}{729}$$

Given the first term "a" and common ratio "r", generate the next three terms in a geometric sequence.

7.  $a = 12.3$ ;  $r = 0.5$

Answers:

$$a_2 = (12.3)(0.5) = 6.15$$

$$a_3 = (12.3)(0.5)^2 = 3.075$$

$$a_4 = (12.3)(0.5)^3 = 1.5375$$

8.  $a = -4$ ;  $r = -2$

Answers:

$$a_2 = (-4)(-2) = 8$$

$$a_3 = (-4)(-2)^2 = -16$$

$$a_4 = (-4)(-2)^3 = 32$$

# Geometric Sequences Assignment

Find the nth term of the following geometric sequence.

9.  $a = 1; r = 3; n = 8$

Answer:

$$a_8 = (1)(3)^{8-1} = (1)(3)^7 = 2187$$

10.  $a = 4; r = 2; n = 5$

Answer:

$$a_8 = (4)(2)^{8-1} = (4)(2)^7 = 512$$

Given the first term, the nth term and the common ratio find the sum of the following geometric sequence.

11.  $a = 3; a_5 = 48; r = 2$

Answer:

$$S = \frac{3 - (2)(48)}{1 - 2} = \frac{3 - 96}{-1} = 93$$

12.  $a = 2; a_8 = 4374; r = 3$

Answer:

$$S = \frac{2 - (3)(4374)}{1 - 3} = \frac{2 - 13122}{-2} = 6560$$

Given the first term and the common ratio find the sum of the first 10 terms of the following sequence.

13.  $a = 3; r = 5$

Answer:

$$S = \frac{(3)(1 - (5)^{10})}{1 - 5} = \frac{3(-9765624)}{-4} = 7324218$$

14.  $a = 2; r = -5$

Answer:

$$S = \frac{(2)(1 - (-5)^{10})}{1 - (-5)} = \frac{2(-9765624)}{6} = -3255208$$

Solve the following problem involving geometric sequence.

13. Find the fourteenth term of a geometric sequence  $\frac{1}{8}, \frac{1}{4}, \frac{1}{2}, \dots$

Given:

$$a = \frac{1}{8}; r = 2; n = 14$$

Solution:

$$a_{14} = \left(\frac{1}{8}\right)(2)^{14-1} = \left(\frac{1}{8}\right)(2)^{13}$$

$$= \left(\frac{1}{8}\right)(8192) = 1024$$

14. Find the one-hundred first term of the geometric sequence with  $a = 3$  and  $r = -1$ .

Solution:

$$a_{101} = (3)(-1)^{101-1} = (3)(1) = 3$$

## Geometric Sequences Assignment

15. Find the sum of the first 11 term of a geometric sequence with  $a = 2$  and  $r = -3$

Solution:

$$S = \frac{(2)(1 - (-3)^{11})}{1 - (-3)} = \frac{2(1 + 177147)}{4}$$

$$= \frac{2(177148)}{4} = 88574$$

16. If the sum of the first seven terms of a geometric sequence is 547 and the common ratio is -3, find the first term of a sequence.

Given:

$$S = 547; r = -3; n = 7$$

Solution:

$$547 = \frac{a(1 - (-3)^7)}{1 - (-3)} = \frac{2188a}{4}$$

$$547(4) = 2188a$$

$$2188 = 2188a$$

$$a = 1$$

19. An amount of \$1000 is deposited in an account that pays 6% compounded annually . Find the common ratio and the amount after 4 years.

Given:

$$a = 1000; n = 4$$

Solution:

$$\text{Common ratio equals } (1000 = 1) + (6\% = 0.06) = 1.06$$

$$a_4 = (1000)(1.06)^{4-1} = (1000)(1.06)^3$$

$$= (1000)(1.91016) = 1191.016$$

Or using compound amount formula  $P(1 + r)^{n-1}$

$$1000(1 + 0.06)^{4-1} = 1191.016$$

You will have \$1191.016

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## Geometric Sequences Assignment

20. Suppose you have the following: \$1 in the first day, \$2 in the second day, \$4 in the third day, etc. each day saving double of what you save the previous day. How many dollars you would have after 30 days?

Given:

$$a = 1; r = 2; n = 30$$

Solution:

$$S = \frac{(1)(1 - (2)^{30})}{1 - 2} = \frac{-10737418}{-1}$$
$$= 10737418$$

You will have a total of \$10,737,418