

Unit 3 Worksheet

Write the first five terms of each geometric sequence.

1) $a_1 = 24, r = \frac{1}{3}$

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

Use the formula for the general term of a geometric sequence to find the indicated term of each sequence with the given first term, a_1 , and common ratio, r .

3) Find a_{12} , when $a_1 = 4, r = -2$.

4) Find a_{30} , when $a_1 = -8000, r = \frac{1}{2}$.

Write a formula for the general term (the n th term) of each geometric sequence. Then use the formula for a_n to find a_9 , the 9th term of the sequence.

5) $5, -1, \frac{1}{5}, -\frac{1}{25}, \dots$

6) $0.07, 0.007, 0.0007, 0.00007, \dots$

Find the sum of the finite geometric series.

7) Find the sum of the first 12 terms of the geometric sequence:

$$-3, 6, -12, 24, \dots$$

Find the sum of the first 11 terms of the geometric sequence:

8) $-\frac{1}{24}, \frac{1}{12}, -\frac{1}{6}, \frac{1}{3}, \dots$

Find the sum of the finite geometric series.

9) $\sum_{i=1}^6 4^i$

10) $\sum_{i=1}^{\infty} \left(\frac{1}{3}\right)^{i+1}$

Find the sum of the infinite geometric series.

11) $1 + \frac{1}{4} + \frac{1}{16} + \frac{1}{64} + \dots$

12) $3 - 1 + \frac{1}{3} - \frac{1}{9} + \dots$

Are the following sequences arithmetic, geometric, or neither? State the sum or difference.

13) $\frac{1}{3}, -\frac{1}{5}, -\frac{1}{7}, -\frac{1}{9}, \dots$

14) $-\frac{2}{3}, -\frac{5}{3}, -\frac{8}{3}, -\frac{11}{3}, \dots$

Write a formula for the general term (the nth term) of each arithmetic sequence.

15) $a_7 = -12, a_{12} = 38$

16) $a_{20} = 38, a_{23} = -10$

Find the sum.

17) $\sum_{k=1}^{10} (-3 + 2k)$

18) $\sum_{i=1}^{10} \frac{1}{3} (-2)^i$

Simplify. Show all necessary work. Answers should contain only positive exponents.

19) $\left(\frac{x^5}{2x^{-2}}\right)^{-3}$

20) $4(x^2)^{-5}(2x)^{-4}$

21) $(4x^3)(2x^5)(3x)^2$

22) $\left(\frac{3x^2y^{-4}}{2x^3y}\right)^{-2}$

23) $\sqrt[3]{-48x^5y^{10}}$

24) $\left(3^{\frac{3}{4}}\right)\left(9^{\frac{1}{4}}\right)$

25) $\frac{2x^{-\frac{1}{2}}}{6x^{\frac{2}{3}}}$

26) $3x^4 \cdot 4x^{\frac{3}{2}} \cdot 5x^{\frac{1}{2}}$

27) $(8p^9)^{\frac{2}{3}}$

Solve each equation.

28) $\sqrt{5^{x+1}} = 5^{2x+3}$

29) $216^{3x} = 36^{x-2}$

$$30) \left(\frac{1}{8}\right)^x = 16^{2x+3}$$

$$31) 4^{-x+1} \cdot 2^{-3x-4} = 8$$

$$32) 3^{x-2} \cdot \left(\frac{1}{9}\right)^{x+1} = 27^x$$

$$33) 7^{2x+3} - 7^{5x} = 0$$