Geometric Series and Sequences

Student Practice Pages

This packet includes student worksheets with practice problems for each of the following topics.

- ❑ Finding the Next Terms
- ❑ Finding the nth Term
- ❑ Writing Equations for the nth Terms
- ❑ Find a Term in the Sequence Given a Term in the Sequence and the Common Ratio
- ❑ Finding Geometric Means
- ❑ Find the Sum of a Geometric Series
- ❑ Find the First Term in a Geometric Series
- ❑ Find the Indicated Term of a Geometric Series
- ❑ Find the Sum of an Infinite Geometric Series
- ❑ Sum of an Finite Series in Sigma Notation
- ❑ Sum of an Infinite Series in Sigma Notation

Name _____ Date _____

Geometric Sequences: Finding the Next Terms

1. Find the next 2 terms in the sequence.

$6 \quad 24 \quad 96$

What is the common ratio (r)?

The next 2 numbers in the sequence are...

_____ and _____

2. Find the next 3 terms in the sequence.

$96 \quad 24 \quad 6$

What is the common ratio (r)?

The next 3 numbers in the sequence are...

_____ ,_____, and _____

3. Find the next 2 terms in the sequence.

$13 \quad -39 \quad 117$

What is the common ratio (r)?

The next 2 numbers in the sequence are...

_____ and _____

4. Find the next 3 terms in the sequence.

$500 \quad 100 \quad 20$

What is the common ratio (r)?

The next 3 numbers in the sequence are...

_____ ,_____, and _____

5. Find the next 2 terms in the sequence.

$4 \quad 32 \quad 256$

What is the common ratio (r)?

The next 2 numbers in the sequence are...

_____ and _____

6. Find the next 3 terms in the sequence.

$-128 \quad 32 \quad -8$

What is the common ratio (r)?

The next 3 numbers in the sequence are...

_____ ,_____, and _____

7. Find the next 2 terms in the sequence.

$800 \quad -80 \quad 8$

What is the common ratio (r)?

The next 2 numbers in the sequence are...

_____ and _____

8. Find the next 3 terms in the sequence.

$32 \quad 40 \quad 50$

What is the common ratio (r)?

The next 3 numbers in the sequence are...

_____ ,_____, and _____

Name _____KEY_____ Date _____

Geometric Sequences: Finding the Next Terms

1 Find the next 2 terms in the sequence.

$6 \quad 24 \quad 96$

What is the common ratio (r)?

$r = 4$

The next 2 numbers in the sequence are…

384 and 1536

2 Find the next 3 terms in the sequence.

$96 \quad 24 \quad 6$

What is the common ratio (r)?

$r = \frac{1}{4}$

The next 3 numbers in the sequence are…

$\frac{3}{2}$, $\frac{3}{8}$, and $\frac{3}{32}$

3 Find the next 2 terms in the sequence.

$13 \quad -39 \quad 117$

What is the common ratio (r)?

$r = -3$

The next 2 numbers in the sequence are…

-351 and 1053

4 Find the next 3 terms in the sequence.

$500 \quad 100 \quad 20$

What is the common ratio (r)?

$r = \frac{1}{5}$

The next 3 numbers in the sequence are…

4, $\frac{4}{5}$, and $\frac{4}{25}$

5 Find the next 2 terms in the sequence.

$4 \quad 32 \quad 256$

What is the common ratio (r)?

$r = 8$

The next 2 numbers in the sequence are…

2048 and $16{,}384$

6 Find the next 3 terms in the sequence.

$-128 \quad 32 \quad -8$

What is the common ratio (r)?

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

The next 3 numbers in the sequence are…

2, $-\frac{1}{2}$, and $\frac{1}{8}$

7 Find the next 2 terms in the sequence.

$800 \quad -80 \quad 8$

What is the common ratio (r)?

$r = -\frac{1}{10}$

The next 2 numbers in the sequence are…

$-\frac{4}{5}$ and $\frac{2}{25}$

8 Find the next 3 terms in the sequence.

$32 \quad 40 \quad 50$

What is the common ratio (r)?

$r = 1.25$

The next 3 numbers in the sequence are…

62.5, 78.125, and 97.65625

Name _____ Date _____

Geometric Sequences: Finding the nth Term

1. Assuming that the geometric sequence continues, how much bacteria will be in the culture at the end of 7 hours?

Hour(s)	1	2	3
Bacteria	25	275	3025

Use the formula for finding the nth term in a geometric sequence to find a_7.

2. Assuming that the geometric sequence continues, what will the account balance be in the savings account after 5 years?

Year(s)	1	2	3
Balance	785	2041	5306.6

Use the formula for finding the nth term in a geometric sequence to find a_5.

3. Assuming that the geometric sequence continues, what will the person's salary be on year 8?

Year(s)	1	2	3
Salary	32,000	34,560	37,324.80

Use the formula for finding the nth term in a geometric sequence to find a_8.

4. Assuming that the geometric sequence continues, how many bacteria will be in the culture at the end of 12 hours?

Hour(s)	1	2	3
Bacteria	15	112.5	843.75

Use the formula for finding the nth term in a geometric sequence to find a_{12}.

5. Assuming that the geometric sequence continues, how much bacteria will be in the culture at the end of 10 hours?

Hour(s)	1	2	3
Bacteria	62	496	3,968

Use the formula for finding the nth term in a geometric sequence to find a_{10}.

6. Assuming that the geometric sequence continues, what will the account balance be in the savings account after 11 years?

Year(s)	1	2	3
Balance	930	2,325	5,812.50

Use the formula for finding the nth term in a geometric sequence to find a_{11}.

7. Assuming that the geometric sequence continues, what will the person's salary be on year 6?

Year(s)	1	2	3
Salary	18,000	19,440	20,995.20

Use the formula for finding the nth term in a geometric sequence to find a_6.

8. Assuming that the geometric sequence continues, how many bacteria will be in the culture at the end of 7 hours?

Hour(s)	1	2	3
Bacteria	250	625	1562.50

Use the formula for finding the nth term in a geometric sequence to find a_7.

Name _____KEY_____ Date _____

Geometric Sequences: Finding the nth Term

1 Assuming that the geometric sequence continues, how much bacteria will be in the culture at the end of 7 hours?

Hour(s)	1	2	3
Bacteria	25	275	3025

Use the formula for finding the nth term in a geometric sequence to find a_7.

$a_7 = 25 \cdot (11)^{7-1}$

$a_7 = 44{,}289{,}025$

2 Assuming that the geometric sequence continues, what will the account balance be in the savings account after 5 years?

Year(s)	1	2	3
Balance	785	2041	5306.6

Use the formula for finding the nth term in a geometric sequence to find a_5.

$a_5 = 785 \cdot (2.6)^{5-1}$

$a_5 = 35{,}872.616$

3 Assuming that the geometric sequence continues, what will the person's salary be on year 8?

Year(s)	1	2	3
Salary	32,000	34,560	37,324.80

Use the formula for finding the nth term in a geometric sequence to find a_8.

$a_8 = 32{,}000 \cdot (1.08)^{8-1}$

$a_8 \approx 54{,}842.677$

4 Assuming that the geometric sequence continues, how many bacteria will be in the culture at the end of 12 hours?

Hour(s)	1	2	3
Bacteria	15	112.5	843.75

Use the formula for finding the nth term in a geometric sequence to find a_{12}.

$a_{12} = 15 \cdot (7.5)^{12-1}$

$a_{12} = 63{,}352{,}704{,}048.156$

5 Assuming that the geometric sequence continues, how much bacteria will be in the culture at the end of 10 hours?

Hour(s)	1	2	3
Bacteria	62	496	3,968

Use the formula for finding the nth term in a geometric sequence to find a_{10}.

$a_{10} = 62 \cdot (8)^{10-1}$

$a_{10} = 8{,}321{,}499{,}136$

6 Assuming that the geometric sequence continues, what will the account balance be in the savings account after 11 years?

Year(s)	1	2	3
Balance	930	2,325	5,812.50

Use the formula for finding the nth term in a geometric sequence to find a_{11}.

$a_{11} = 930 \cdot (2.5)^{11-1}$

$a_{11} \approx 8{,}869{,}171.143$

7 Assuming that the geometric sequence continues, what will the person's salary be on year 6?

Year(s)	1	2	3
Salary	18,000	19,440	20,995.20

Use the formula for finding the nth term in a geometric sequence to find a_6.

$a_6 = 18{,}000 \cdot (1.08)^{6-1}$

$a_6 \approx 26{,}447.905$

8 Assuming that the geometric sequence continues, how many bacteria will be in the culture at the end of 7 hours?

Hour(s)	1	2	3
Bacteria	250	625	1562.50

Use the formula for finding the nth term in a geometric sequence to find a_7.

$a_7 = 250 \cdot (2.5)^{7-1}$

$a_7 \approx 61{,}035.156$

Name _____ Date _____

Writing Equations for the nth Terms

1. Write an equation for the nth term in the geometric sequence $112, 224, 448, \ldots$

2. Write an equation for the nth term in the geometric sequence $-15, -60, -240, \ldots$

3. Write an equation for the nth term in the geometric sequence $90, -30, 10, \ldots$

4. Write an equation for the nth term in the geometric sequence $-9, 18, -36, \ldots$

5. Write an equation for the nth term in the geometric sequence $212, 106, 53, \ldots$

6. Write an equation for the nth term in the geometric sequence $-14, -42, -126, \ldots$

7. Write an equation for the nth term in the geometric sequence $840, -420, 210, \ldots$

8. Write an equation for the nth term in the geometric sequence $19, -114, 684, \ldots$

Name _____KEY_____ Date _____

Writing Equations for the nth Terms

1. Write an equation for the nth term in the geometric sequence $112, 224, 448, \ldots$

$a_n = 112 \cdot (2)^{n-1}$

2. Write an equation for the nth term in the geometric sequence $-15, -60, -240, \ldots$

$a_n = -15 \cdot (4)^{n-1}$

3. Write an equation for the nth term in the geometric sequence $90, -30, 10, \ldots$

$a_n = 90 \cdot (-\frac{1}{3})^{n-1}$

4. Write an equation for the nth term in the geometric sequence $-9, 18, -36, \ldots$

$a_n = -9 \cdot (-2)^{n-1}$

5. Write an equation for the nth term in the geometric sequence $212, 106, 53, \ldots$

$a_n = 212 \cdot (\frac{1}{2})^{n-1}$

6. Write an equation for the nth term in the geometric sequence $-14, -42, -126, \ldots$

$a_n = -14 \cdot (3)^{n-1}$

7. Write an equation for the nth term in the geometric sequence $840, -420, 210, \ldots$

$a_n = 840 \cdot (-\frac{1}{2})^{n-1}$

8. Write an equation for the nth term in the geometric sequence $19, -114, 684, \ldots$

$a_n = 19 \cdot (-6)^{n-1}$

Name _____ Date _____

Find a Term in the Sequence Given a Term in the Sequence and the Common Ratio

1. Find the 14th term of a geometric sequence for which $a_1 = \frac{1}{4}$ and $r = 4$.

2. Find the 6th term of a geometric sequence for which $a_5 = 5{,}184$ and $r = 6$.

3. Find the 10th term of a geometric sequence for which $a_6 = 24$ and $r = -2$.

4. Find the 3rd term of a geometric sequence for which $a_1 = \frac{1}{2}$ and $r = -5$.

5. Find the 14th term of a geometric sequence for which $a_1 = 12$ and $r = 0.5$.

6. Find the 5th term of a geometric sequence for which $a_3 = 506.25$ and $r = \frac{3}{4}$.

7. Find the 16th term of a geometric sequence for which $a_6 = 30$ and $r = -0.2$.

8. Find the 4th term of a geometric sequence for which $a_1 = 200$ and $\mathrm{r} = -0.1$.

Name _____KEY_____ Date _____

Find a Term in the Sequence Given a Term in the Sequence and the Common Ratio

1 Find the 14th term of a geometric sequence for which $a_1 = \frac{1}{4}$ and $r = 4$.

$a_{14} = \frac{1}{4} \cdot (4)^{14-1}$

$a_{14} = 16{,}777{,}216$

2 Find the 6th term of a geometric sequence for which $a_5 = 5{,}184$ and $r = 6$.

$5184 = a_1 \cdot (6)^{5-1}$
$5184 = 1296a_1$
$4 = a_1$

$a_6 = 4 \cdot (6)^{6-1}$
$a_6 = 31{,}104$

3 Find the 10th term of a geometric sequence for which $a_6 = 24$ and $r = -2$.

$24 = a_1 \cdot (-2)^{6-1}$
$24 = -32a_1$
$-0.75 = a_1$

$a_{10} = -0.75 \cdot (-2)^{10-1}$
$a_{10} = 384$

4 Find the 3rd term of a geometric sequence for which $a_1 = \frac{1}{2}$ and $r = -5$.

$a_3 = \frac{1}{2} \cdot (-5)^{3-1}$

$a_3 = 12.5$

5 Find the 14th term of a geometric sequence for which $a_1 = 12$ and $r = 0.5$.

$a_{14} = 12 \cdot (0.5)^{14-1}$

$a_{14} \approx 0.001465$

6 Find the 5th term of a geometric sequence for which $a_3 = 506.25$ and $r = \frac{3}{4}$.

$506.25 = a_1 \cdot \left(\frac{3}{4}\right)^{3-1}$
$506.25 = 0.5625a_1$
$900 = a_1$

$a_5 = 900 \cdot (\frac{3}{4})^{5-1}$
$a_5 \approx 284.766$

7 Find the 16th term of a geometric sequence for which $a_6 = 30$ and $r = -0.2$.

$30 = a_1 \cdot (-0.2)^{6-1}$
$30 = -0.00032a_1$
$-93750 = a_1$

$a_{16} = -93750 \cdot (-0.2)^{16-1}$
$a_{16} = 0.000003072$

8 Find the 4th term of a geometric sequence for which $a_1 = 200$ and $r = -0.1$.

$a_4 = 200 \cdot (-0.1)^{4-1}$

$a_4 = -0.2$

Name _____ Date _____

Finding Geometric Means

1. Find the geometric means in the sequence.

$2000, \_\_\_\_, \_\_\_\_, 2$

2. Find the geometric means in the sequence.

$-2, \_\_\_\_, \_\_\_\_, \_\_\_\_, -512$

3. Find the geometric means in the sequence.

$-4, \_\_\_\_, \_\_\_\_, \_\_\_\_, -2500$

4. Find the geometric means in the sequence.

$-450, \_\_\_\_, \_\_\_\_, \_\_\_\_, -0.72$

5. Find the geometric means in the sequence.

$380, \_\_\_\_, \_\_\_\_, \_\_\_\_, 23.75$

6. Find the geometric means in the sequence.

$23, \_\_\_\_, \_\_\_\_, 621$

7. Find the geometric means in the sequence.

$920, \_\_\_\_, \_\_\_\_, 115$

8. Find the geometric means in the sequence.

$-4941, \_\_\_\_, \_\_\_\_, \_\_\_\_, -61$

Name _____KEY_____ Date _____

Finding Geometric Means

1 Find the geometric means in the sequence.

$2000, \_\_\_\_, \_\_\_\_, 2$

$2 = 2000 \cdot r^{4-1}$
$0.001 = r^3$
$\sqrt[3]{0.001} = r$
$0.1 = r$

When $r = 0.1$, the geometric means are $2000, 200, 20, 2$.

2 Find the geometric means in the sequence.

$-2, \_\_\_\_, \_\_\_\_, \_\_\_\_, -512$

$-512 = -2 \cdot r^{5-1}$
$256 = r^4$
$\sqrt[4]{256} = r$
$\pm 4 = r$
When $r = 4$, the geometric means are $-2, -8, -32, -128, -512$.
When $r = -4$, the geometric means are $-2, 8, -32, 128, -512$.

3 Find the geometric means in the sequence.

$-4, \_\_\_\_, \_\_\_\_, \_\_\_\_, -2500$

$-2500 = -4 \cdot r^{5-1}$
$625 = r^4$
$\sqrt[4]{625} = r$
$\pm 5 = r$
When $r = 5$, the geometric means are $-4, -20, -100, -500, -2500$.
When $r = -5$, the geometric means are $-4, 20, -100, 500, -2500$.

4 Find the geometric means in the sequence.

$-450, \_\_\_\_, \_\_\_\_, \_\_\_\_, -0.72$

$-0.72 = -450 \cdot r^{5-1}$
$0.0016 = r^4$
$\sqrt[4]{0.0016} = r$
$\pm 0.2 = r$
When $r = 0.2$, the geometric means are $-440, -90, -18, -3.6, -0.72$.
When $r = -0.2$, the geometric means are $-440, 90, -18, 3.6, -0.72$.

5 Find the geometric means in the sequence.

$380, \_\_\_\_, \_\_\_\_, \_\_\_\_, 23.75$

$23.75 = 380 \cdot r^{5-1}$
$0.0625 = r^4$
$\sqrt[4]{0.0625} = r$
$\pm 0.5 = r$
When $r = 0.5$, the geometric means are $380, 190, 95, 47.5, 23.75$.
When $r = -0.5$, the geometric means are $380, -190, 95, -47.5, 23.75$.

6 Find the geometric means in the sequence.

$23, \_\_\_\_, \_\_\_\_, 621$

$621 = 23 \cdot r^{4-1}$
$27 = r^3$
$\sqrt[3]{27} = r$
$3 = r$

When $r = 3$, the geometric means are $23, 69, 207, 621$.

7 Find the geometric means in the sequence.

$920, \_\_\_\_, \_\_\_\_, 115$

$115 = 920 \cdot r^{4-1}$
$0.125 = r^3$
$\sqrt[3]{0.125} = r$
$0.5 = r$

When $r = 0.5$, the geometric means are $920, 460, 230, 115$.

8 Find the geometric means in the sequence.

$-4941, \_\_\_\_, \_\_\_\_, \_\_\_\_, -61$

$-61 = -4941 \cdot r^{5-1}$
$0.012345679 = r^4$
$\sqrt[4]{0.012345679} = r$
$\pm 1/3 = r$
When $r = 1/3$, the geometric means are $-4941, -1647, -549, -183, -61$.
When $r = -1/3$, the geometric means are $-4941, 1647, -549, 183, -61$.

Name _____ Date _____

Find the Sum of a Geometric Series

1. Find the sum of the geometric series $a_1 = \frac{1}{3},\ n = 10$ and $r = 3$.

2. Find the sum of the geometric series $a_1 = -9, n = 4$ and $r = \frac{2}{3}$.

3. Find the sum of the geometric series $a_1 = 3,\ n = 4$ and $r = \frac{1}{3}$.

4. Find the sum of the geometric series $a_1 = 16, n = 6$ and $r = -1.5$.

5. Given $a_1 = -3, a_n = -192,$ and $r = -2$, find S_n.

6. Given $a_1 = 2, a_n = 486,$ and $r = 3$, find S_n.

7. Given $a_1 = 1200, a_n = 16,$ and $r = \frac{1}{2}$, find S_n.

8. Given $a_1 = \frac{1}{25}, a_n = 125,$ and $r = 5$, find S_n.

Name _____KEY_____ Date _____

Find the Sum of a Geometric Series

1 Find the sum of the geometric series $a_1 = \frac{1}{3},\ n = 10$ and $r = 3$.

$$S_n = \frac{(\frac{1}{3}) - (\frac{1}{3})(3)^{10}}{1 - (3)}$$

$$S_n \approx 9841.33$$

2 Find the sum of the geometric series $a_1 = -9, n = 4$ and $r = \frac{2}{3}$.

$$S_n = \frac{(-9) - (-9)(\frac{2}{3})^4}{1 - (\frac{2}{3})}$$

$$S_n \approx -21.67$$

3 Find the sum of the geometric series $a_1 = 3,\ n = 4$ and $r = \frac{1}{3}$.

$$S_n = \frac{(3) - (3)(\frac{1}{3})^4}{1 - (\frac{1}{3})}$$

$$S_n \approx 4.44$$

4 Find the sum of the geometric series $a_1 = 16, n = 6$ and $r = -1.5$.

$$S_n = \frac{(16) - (16)(-1.5)^6}{1 - (-1.5)}$$

$$S_n = -66.5$$

5 Given $a_1 = -3, a_n = -192,$ and $r = -2$, find S_n.

Find n.

$$-192 = -3 \cdot (-2)^{n-1}$$
$$64 = (-2)^{n-1}$$
$$(-2)^6 = (-2)^{n-1}$$
$$6 = n - 1$$
$$7 = n$$

$$S_n = \frac{(-3) - (-3)(-2)^7}{1 - (-2)}$$

$$S_n = -129$$

6 Given $a_1 = 2, a_n = 486,$ and $r = 3$, find S_n.

Find n.

$$486 = 2 \cdot (3)^{n-1}$$
$$243 = (3)^{n-1}$$
$$(3)^5 = (3)^{n-1}$$
$$5 = n - 1$$
$$6 = n$$

$$S_n = \frac{(2) - (2)(3)^6}{1 - (3)}$$

$$S_n = 728$$

7 Given $a_1 = 1200, a_n = 75,$ and $r = \frac{1}{2}$, find S_n.

Find n.

$$75 = 1200 \cdot (\frac{1}{2})^{n-1}$$
$$\frac{1}{16} = (\frac{1}{2})^{n-1}$$
$$(\frac{1}{2})^4 = (\frac{1}{2})^{n-1}$$
$$4 = n - 1$$
$$5 = n$$

$$S_n = \frac{(1200) - (1200)(\frac{1}{2})^5}{1 - (\frac{1}{2})}$$

$$S_n = 2325$$

8 Given $a_1 = \frac{1}{25}, a_n = 125,$ and $r = 5$, find S_n.

Find n.

$$125 = \frac{1}{25} \cdot (5)^{n-1}$$
$$3125 = (5)^{n-1}$$
$$(5)^5 = (5)^{n-1}$$
$$5 = n - 1$$
$$6 = n$$

$$S_n = \frac{(\frac{1}{25}) - (\frac{1}{25})(5)^6}{1 - (5)}$$

$$S_n = 156.24$$

Name _____ Date _____

Find the First Term in a Geometric Series

1. Given $r = 3, a_n = 486$, and $S_n = 726$, find a_1.

2. Given $n = 12, r = -2$, and $S_n = -1365$, find a_1.

3. Given $r = -2, a_n = 1280$, and $S_n = 850$, find a_1.

4. Given $n = 5, r = -3$, and $S_n = 183$, find a_1.

5. Given $r = 4, n = 5$, and $S_n = 1705$, find a_1.

6. Given $n = 7, r = -5$, and $S_n = 52{,}084$, find a_1.

7. Given $r = 2, n = 7$, and $S_n = 381$, find a_1.

8. Given $n = 6, r = 1.5$, and $S_n = 665$, find a_1.

Name _____KEY_____ Date _____

Find the First Term in a Geometric Series

1. Given $r = 3, a_n = 486$, and $S_n = 726$, find a_1.

$$726 = \frac{a_1 - (486)(3)}{1 - (3)}$$

$$726 = \frac{a_1 - 1458}{-2}$$

$$6 = a_1$$

2. Given $n = 12, r = -2$, and $S_n = -1365$, find a_1.

$$-1365 = \frac{a_1(1 - (-2)^{12})}{1 - (-2)}$$

$$-1365 = \frac{-4095a_1}{3}$$

$$-4095 = -4095a_1$$

$$1 = a_1$$

3. Given $r = -2, a_n = 1280$, and $S_n = 850$, find a_1.

$$850 = \frac{a_1 - (1280)(-2)}{1 - (-2)}$$

$$850 = \frac{a_1 + 2580}{3}$$

$$-30 = a_1$$

4. Given $n = 5, r = -3$, and $S_n = 183$, find a_1.

$$183 = \frac{a_1(1 - (-3)^5)}{1 - (-3)}$$

$$183 = \frac{244\, a_1}{4}$$

$$732 = 244a_1$$

$$3 = a_1$$

5. Given $r = 4, n = 5$, and $S_n = 1705$, find a_1.

$$1705 = \frac{a_1(1 - (4)^5)}{1 - (4)}$$

$$1705 = \frac{-1023\, a_1}{-3}$$

$$-5115 = -1023a_1$$

$$= a_1$$

6. Given $n = 7, r = -5$, and $S_n = 52{,}084$, find a_1.

$$52084 = \frac{a_1(1 - (-5)^7)}{1 - (-5)}$$

$$52084 = \frac{78126\, a_1}{6}$$

$$312504 = 78126a_1$$

$$4 = a_1$$

7. Given $r = 2, n = 7$, and $S_n = 381$, find a_1.

$$381 = \frac{a_1(1 - (2)^7)}{1 - (2)}$$

$$381 = \frac{-127\, a_1}{-1}$$

$$-381 = -127a_1$$

$$3 = a_1$$

8. Given $n = 6, r = 1.5$, and $S_n = 665$, find a_1.

$$665 = \frac{a_1(1 - (1.5)^6)}{1 - (1.5)}$$

$$665 = \frac{-10.390625\, a_1}{-0.5}$$

$$-1330 = -10.390625a_1$$

$$128 = a_1$$

Name _____ Date _____

Find the Indicated Term of a Geometric Series

1. Given $r = 2, n = 6,$ and $S_n = 441,$ find a_5.

2. Given $a_n = 768, r = 4,$ and $S_n = 1023,$ find a_2.

3. Given $r = \frac{1}{4}, n = 3,$ and $S_n = 10.5,$ find a_3.

4. Given $a_n = 5120, r = 2,$ and $S_n = 10{,}160,$ find a_1.

5. Given $r = 5, n = 3,$ and $S_n = -62,$ find a_1.

6. Given $a_n = 1024, r = -2,$ and $S_n = 684,$ find a_3.

7. Given $r = -3, n = 4,$ and $S_n = -60,$ find a_2.

8. Given $a_n = 8748, r = 3,$ and $S_n = 13{,}120,$ find a_1.

Name _____KEY_____ Date _____

Find the Indicated Term of a Geometric Series

1 Given $r = 2, n = 6,$ and $S_n = 441,$ find a_5.

$441 = \frac{a_1(1-(2)^6)}{1-(2)}$

$441 = \frac{-63a_1}{-1}$

$7 = a_1$

$a_5 = 7 \cdot (2)^{6-1}$

$a_5 = 224$

2 Given $a_n = 768, r = 4,$ and $S_n = 1023,$ find a_2.

$1023 = \frac{a_1 - (768)(4)}{1-(4)}$

$1023 = \frac{a_1 - 3072}{-3}$

$3 = a_1$

$a_2 = 3 \cdot (4)^{2-1}$

$a_2 = 12$

3 Given $r = \frac{1}{4}, n = 3,$ and $S_n = 10.5,$ find a_3.

$10.5 = \frac{a_1(1-(\frac{1}{4})^3)}{1-(\frac{1}{4})}$

$10.5 = \frac{0.984375a_1}{0.75}$

$8 = a_1$

$a_3 = 8 \cdot (\frac{1}{4})^{3-1}$

$a_3 = 0.5$

4 Given $a_n = 5120, r = 2,$ and $S_n = 10{,}160,$ find a_1.

$10160 = \frac{a_1 - (5120)(2)}{1-(2)}$

$10160 = \frac{a_1 - 10240}{-1}$

$80 = a_1$

5 Given $r = 5, n = 3,$ and $S_n = -62,$ find a_1.

$-62 = \frac{a_1(1-(5)^3)}{1-(5)}$

$-62 = \frac{-124a_1}{-4}$

$-2 = a_1$

6 Given $a_n = 1024, r = -2,$ and $S_n = 684,$ find a_3.

$684 = \frac{a_1 - (1024)(-2)}{1-(-2)}$

$1023 = \frac{a_1 + 3072}{3}$

$-3 = a_1$

$a_3 = -3 \cdot (-2)^{3-1}$

$a_3 = -12$

7 Given $r = -3, n = 4,$ and $S_n = -60,$ find a_2.

$-60 = \frac{a_1(1-(-3)^4)}{1-(-3)}$

$-60 = \frac{-80a_1}{4}$

$3 = a_1$

$a_2 = 3 \cdot (-3)^{2-1}$

$a_2 = -9$

8 Given $a_n = 8748, r = 3,$ and $S_n = 13{,}120,$ find a_1.

$13120 = \frac{a_1 - (8748)(3)}{1-(3)}$

$13120 = \frac{a_1 - 26244}{-2}$

$4 = a_1$

Name _____ Date _____

Find the Sum of an Infinite Geometric Series

1. Find the sum of the infinite geometric series, if it exists.
$100 + 20 + 4 + \ldots$

2. Find the sum of the infinite geometric series, if it exists.
$2 + 6 + 18 + \ldots$

3. Find the sum of the infinite geometric series, if it exists.
$54 + 18 + 6 + \ldots$

4. Find the sum of the infinite geometric series, if it exists.
$\frac{1}{10} + \frac{1}{20} + \frac{1}{40} + \ldots$

5. Find the sum of the infinite geometric series, if it exists.
$6 - 12 + 24 - 48 + \ldots$

6. Find the sum of the infinite geometric series, if it exists.
$-270 + 135 - 67.5 + \ldots$

7. Find the sum of the infinite geometric series, if it exists.
$1 + 0.5 + 0.25 + \ldots$

8. Find the sum of the infinite geometric series, if it exists.
$81 - 27 + 9 - 3 \ldots$

Name _____KEY_____ Date _____

Find the Sum of an Infinite Geometric Series

1. Find the sum of the infinite geometric series, if it exists.

$100 + 20 + 4 + \ldots$

$S = \frac{100}{1 - (0.2)}$

$S = 125$

2. Find the sum of the infinite geometric series, if it exists.

$2 + 6 + 18 + \ldots$

does not exist

3. Find the sum of the infinite geometric series, if it exists.

$54 + 18 + 6 + \ldots$

$S = \frac{54}{1 - (\frac{1}{3})}$

$S = 81$

4. Find the sum of the infinite geometric series, if it exists.

$\frac{1}{10} + \frac{1}{20} + \frac{1}{40} + \ldots$

$S = \frac{0.10}{1 - (0.5)}$

$S = 0.2$

5. Find the sum of the infinite geometric series, if it exists.

$6 - 12 + 24 - 48 + \ldots$

does not exist

6. Find the sum of the infinite geometric series, if it exists.

$-270 + 135 - 67.5 + \ldots$

$S = \frac{-270}{1 - (-0.5)}$

$S = -180$

7. Find the sum of the infinite geometric series, if it exists.

$1 + 0.5 + 0.25 + \ldots$

$S = \frac{1}{1 - (0.5)}$

$S = 2$

8. Find the sum of the infinite geometric series, if it exists.

$81 - 27 + 9 - 3 \ldots$

$S = \frac{81}{1 - (-\frac{1}{3})}$

$S = 60.75$

Name _____ Date _____

Sum of a Finite Series in Sigma Notation

Find the sum of the finite series.

1. $\sum_{n=1}^{7} 4^{n-1}$

2. $\sum_{n=1}^{5} (-4)^{n-1}$

3. $\sum_{n=1}^{9} (-2)^{n-1}$

4. $\sum_{n=1}^{2} 3(\frac{1}{3})^{n-1}$

5. $\sum_{n=1}^{5} 5(3)^{n-1}$

6. $\sum_{n=1}^{3} (-\frac{1}{4})^{n-1}$

7. $\sum_{n=1}^{10} (-2)^{n-1}$

8. $\sum_{n=1}^{3} (\frac{1}{2})^{n-1}$

Name _____KEY_____ Date _____

Sum of a Finite Series in Sigma Notation

Find the sum of the finite series.

1. $\sum_{n=1}^{7} 4^{n-1}$

$S_n = \frac{1\,(1-4^7)}{1-4}$

$S_n = 5461$

2. $\sum_{n=1}^{5} (-4)^{n-1}$

$S_n = \frac{1\,(1-(-4)^5)}{1-(-4)}$

$S_n = 205$

3. $\sum_{n=1}^{9} (-2)^{n-1}$

$S_n = \frac{1\,(1-(-2)^9)}{1-(-2)}$

$S_n = 171$

4. $\sum_{n=1}^{2} 3(\frac{1}{3})^{n-1}$

$S_n = \frac{3\,(1-(\frac{1}{3})^2)}{1-(\frac{1}{3})}$

$S_n = 4$

5. $\sum_{n=1}^{5} 5(3)^{n-1}$

$S_n = \frac{5\,(1-(3)^5)}{1-(3)}$

$S_n = 605$

6. $\sum_{n=1}^{3} (-\frac{1}{4})^{n-1}$

$S_n = \frac{1\,(1-(-\frac{1}{4})^3)}{1-(-\frac{1}{4})}$

$S_n = 0.8125$

7. $\sum_{n=1}^{10} (-2)^{n-1}$

$S_n = \frac{1\,(1-(-2)^{10})}{1-(-2)}$

$S_n = -341$

8. $\sum_{n=1}^{3} (\frac{1}{2})^{n-1}$

$S_n = \frac{1\,(1-(\frac{1}{2})^{11})}{1-(\frac{1}{2})}$

$S_n = 1.75$

Name _____ Date _____

Sum of an Infinite Series in Sigma Notation

Find the sum of the infinite series.

1. $\sum_{n=1}^{\infty} 6(-\frac{1}{5})^{n-1}$

2. $\sum_{n=1}^{\infty} -9(-\frac{1}{8})^{n-1}$

3. $\sum_{n=1}^{\infty} (\frac{2}{3})^{n-1}$

4. $\sum_{n=1}^{\infty} 3^{n-1}$

5. $\sum_{n=1}^{\infty} 10(\frac{3}{4})^{n-1}$

6. $\sum_{n=1}^{\infty} 12(-\frac{1}{2})^{n-1}$

7. $\sum_{n=1}^{\infty} 23(-\frac{1}{3})^{n-1}$

8. $\sum_{n=1}^{\infty} 14(\frac{3}{5})^{n-1}$

Name _____KEY_____ Date _____

Sum of an Infinite Series in Sigma Notation

Find the sum of the infinite series.

1. $\sum_{n=1}^{\infty} 6(-\frac{1}{5})^{n-1}$

$S = \frac{6}{1-(-\frac{1}{5})}$

$S = 5$

2. $\sum_{n=1}^{\infty} -9(-\frac{1}{8})^{n-1}$

$S = \frac{-9}{1-(-\frac{1}{8})}$

$S = -8$

3. $\sum_{n=1}^{\infty} (\frac{2}{3})^{n-1}$

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

$S = 3$

4. $\sum_{n=1}^{\infty} 3^{n-1}$

$S = \frac{1}{1-(3)}$

$S = -0.5$

5. $\sum_{n=1}^{\infty} 10(\frac{3}{4})^{n-1}$

$S = \frac{10}{1-(\frac{3}{4})}$

$S = 40$

6. $\sum_{n=1}^{\infty} 12(-\frac{1}{2})^{n-1}$

$S = \frac{12}{1-(-\frac{1}{2})}$

$S = 8$

7. $\sum_{n=1}^{\infty} 23(-\frac{1}{3})^{n-1}$

$S = \frac{23}{1-(-\frac{1}{3})}$

$S = 17.25$

8. $\sum_{n=1}^{\infty} 14(\frac{3}{5})^{n-1}$

$S = \frac{14}{1-(\frac{3}{5})}$

$S = 40$

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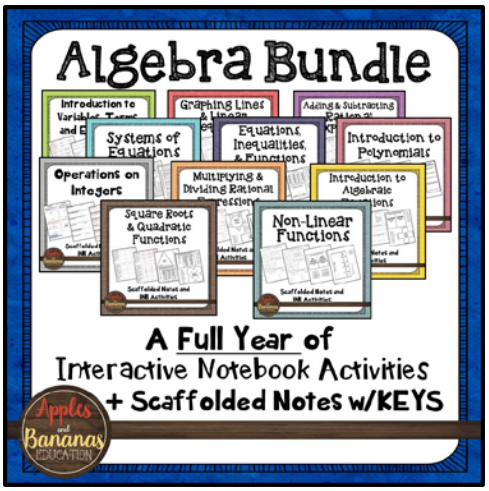

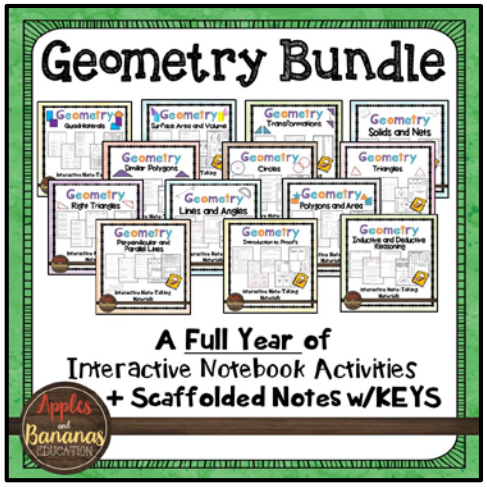

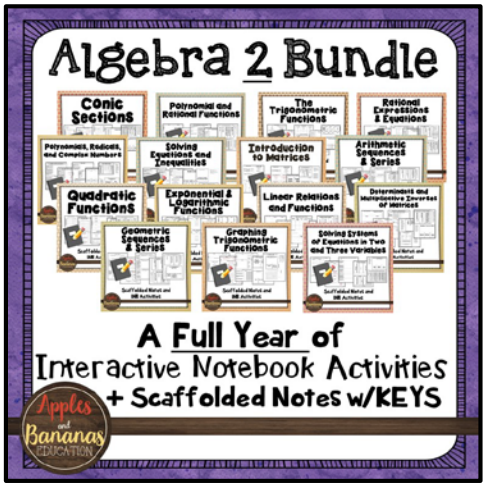

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