

Name: \_\_\_\_\_ Per: \_\_\_\_\_ Date: \_\_\_\_\_  
Serafino • Algebra 2E

Sum of a converging,  
infinite geometric series

$$S_{\infty} = \frac{a_1}{1-r}$$

Where  $-1 < r < 1$

**8D2** INFINITE Geometric Series

Classwork/Homework

An **infinite** geometric series will have a sum if it is **convergent**.  
If  $|r|$  is less than 1; the absolute value of the terms are getting smaller as  $n$  gets larger...

Classify the following as convergent or divergent.



1)  $a_1 = -3, r = 4$

2)  $a_1 = 4, r = -\frac{3}{4}$

3)  $a_1 = 5.5, r = 0.5$

4)  $a_1 = -1, r = 3$

5)  $81 + 27 + 9 + 3, \dots$

6)  $7.1 + 17.75 + 44.375 + 110.9375, \dots$

7)  $-3 + \frac{12}{5} - \frac{48}{25} + \frac{192}{125}, \dots$

8)  $\frac{128}{3125} - \frac{64}{625} + \frac{32}{125} - \frac{16}{25}, \dots$

9)  $\sum_{k=1}^{\infty} -4^{k-1}$

10)  $\sum_{k=1}^{\infty} \frac{16}{9} \left(\frac{3}{2}\right)^{k-1}$

11)  $\sum_{i=1}^{\infty} 4.2 \cdot 0.2^{i-1}$

12)  $\sum_{k=1}^{\infty} \frac{7}{6} \left(-\frac{1}{4}\right)^{k-1}$

Evaluate the infinite series of the series, if one exists.

13)  $a_1 = 3, r = -\frac{1}{5}$

14)  $a_1 = 1, r = -4$

15)  $a_1 = 1, r = -3$

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

17)  $1 + 0.5 + 0.25 + 0.125\dots$

18)  $3 - \frac{9}{4} + \frac{27}{16} - \frac{81}{64}\dots$

19)  $81 - 27 + 9 - 3\dots$

20)  $1 - 0.6 + 0.36 - 0.216\dots$

21)  $\sum_{k=1}^{\infty} 5 \cdot \left(-\frac{1}{5}\right)^{k-1}$

22)  $\sum_{n=1}^{\infty} -6 \cdot \left(-\frac{1}{2}\right)^{n-1}$

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

24)  $\sum_{k=1}^{\infty} 4^{k-1}$

Determine the common ratio, given the sum of the infinite series:

25)  $a_1 = 1, S = 1.25$

26)  $a_1 = 96, S = 64$

27)  $a_1 = -4, S = -\frac{16}{5}$

28)  $a_1 = 1, S = 2.5$

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