Lesson 1.4: Geometric Series

Complete the *Practice* below. When you have completed all the questions for *Lesson 1.4 Practice – VII* with your best work, mark your work by first comparing your answers to the solutions provided in the *Appendix*. Then, apply the rubric found at the beginning of the *Workbook*.

Practice – VII

1. Determine whether or not the following series are geometric. For those that are geometric, determine S_{10}.

   a. $25 + 50 + 75 + \ldots$

   b. $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \ldots$

c. $1 + 3 + 9 + \ldots$

2. Determine the value of S_n for the following geometric series.

a. $64 - 16 + 4 - 1 + \ldots + \frac{1}{64}$

b. $0.2 - 0.6 + 1.8 - 5.4 + \ldots - 3\,936.6$

3. Determine the value of t_1 for the following geometric series.

a. $S_n = 7\,812, r = 5, t_n = 6\,250$

b. $S_n = 3\,571, r = 0.5, n = 7$

4. Determine the number of terms in the series $3 + 6 + 12 + \ldots + t_n$, given $S_n = 765$.

5. Wade posted a video on the internet and shared the link with five of his best friends. Each of those friends shared the video with five of their friends. This pattern continued ten times.

   a. Ignoring Wade, how many people have viewed this video?

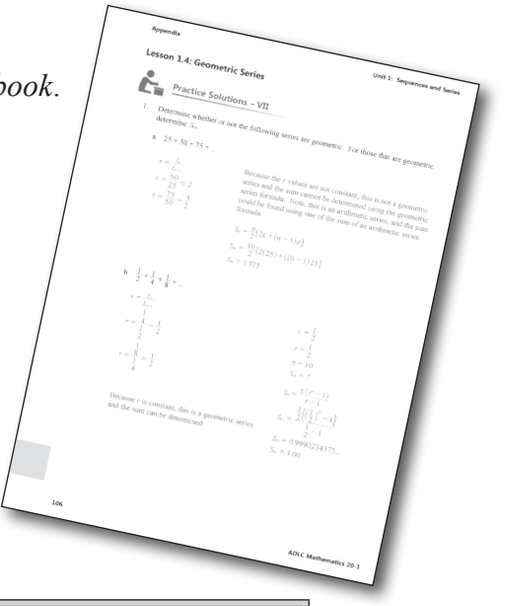
   b. How many times would the pattern need to continue in order for 100 million people to have viewed the video?

c. What assumption is made answering these questions?

Mark your work for *Lesson 1.4 Practice – VII* using the solutions provided in the *Appendix*. Then, apply the rubric found at the beginning of the *Workbook*.

Transfer your self-assessed mark to the front cover of the *Workbook*.

My self-assessed mark on *Lesson 1.4 Practice – VII* is _____.


Appendix

Lesson 1.4: Geometric Series

Unit 1: Sequences and Series

Practice Solutions – VII

1. Determine whether or not the following series are geometric. For those that are geometric, determine S_{10}.

a. $25 + 50 + 75 + \ldots$

$r = \frac{t_2}{t_1}$

$r = \frac{50}{25} = 2$

$r = \frac{75}{50} = \frac{3}{2}$

Because the r values are not constant, this is not a geometric series and the sum cannot be determined using the geometric series formula. Note, this is an arithmetic series, and the sum could be found using one of the sum of an arithmetic series formula

$S_n = \frac{n}{2}[2a + (n-1)d]$

$S_{10} = \frac{10}{2}[2(25) + (10-1)25]$

$S_{10} = 1375$

b. $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \ldots$

$r = \frac{t_2}{t_1}$

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

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

Because r is constant, this is a geometric series and the sum can be determined.

$a = \frac{1}{2}$

$r = \frac{1}{2}$

$n = 10$

$S_{10} = ?$

$S_n = \frac{a(r^n - 1)}{r - 1}$

$S_{10} = \frac{\frac{1}{2}\left[\left(\frac{1}{2}\right)^{10} - 1\right]}{\frac{1}{2} - 1}$

$S_{10} = 0.9990234375\ldots$

$S_{10} \approx 1.00$

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Reflect on your understanding of the concepts addressed in the *Practice* exercises in the table provided.

Question Number	Got it!	Almost there…	Need to retry or ask for help.	Similar questions from *Pre-Calculus 11*
1				p. 53 #1, 2ab, 3bd
2				p. 53 #4ac
3				p. 54 #5a
4				p. 54 #6, 8
5				p. 54 #10, 13, 22

Please return to *Lesson 1.4* to continue your work in *Unit 1: Sequences and Series*.