

A. Multiple Choice. Select the best answer.

1. Determine the common ratio of the geometric sequence $\frac{1}{12}, -\frac{1}{3}, \frac{4}{3}, \dots$

A. 4 B. -4 C. $-\frac{1}{4}$ D. $\frac{1}{4}$

2. Determine the number of terms in the series $\sum_{k=5}^{50} (2k - 53)$.

A. 45 B. 44 C. 47 D. 46

3. Each row in a display of stacked cans has one can less than the row below it. How many cans are required for a display which has 60 cans in the bottom row and 3 cans in the top row?

A. 1 890 B. 1 830 C. 1 827 D. 1 764

4. Determine all values of x such that the following geometric series has a finite sum.

$$1 + \frac{1}{3}x + \frac{1}{9}x^2 + \frac{1}{27}x^3 + \dots$$

A. $0 < x < \frac{1}{3}$ B. $-3 < x < 3, x \neq 0$ C. $-\frac{1}{3} < x < \frac{1}{3}, x \neq 0$ D. $-1 < x < 1, x \neq 0$

5. What is the restriction on the common ratio $r (r \neq 0)$ so that an infinite geometric series has a finite sum?

A. $-1 < r < 1$ B. $0 < r < 1$ C. $r > 1$ D. $r < 1$

6. Which one of the following best illustrates a geometric sequence?

A. m, m^2, m^3, m^4 B. m, m^2, m^4, m^8
C. $m, 2m, 3m, 4m$ D. $m, m + 2, m + 4, m + 8$

7. Determine the sum of the infinite geometric sequence $\frac{1}{2}, -1, 2, \dots$

A. The sum cannot be determined. B. $-\frac{1}{2}$
C. $\frac{1}{6}$ D. $\frac{3}{2}$

8. $\sum_{k=1}^{100} 5(3)^{k-1}$ represents

A. an arithmetic series with $a = 3, d = 5$. B. an arithmetic series with $a = 5, d = 3$.
C. a geometric series with $a = 3, r = 5$. D. a geometric series with $a = 5, r = 3$.

9. If an infinite geometric series has a finite sum, which of the following could be the common ratio r ?

A. 1.5

B. 1.0

C. 0.6

D. -1.2

10. Determine the 70th term of the geometric sequence 2, -4, 8, -16, ...

A. 2^{69}

B. $(-2)^{69}$

C. -2^{70}

D. $(-2)^{70}$

11. In a geometric sequence, $a = 125$ and $t_4 = 6859$, determine the common ratio r correct to the nearest tenth.

A. 18.9

B. 2.7

C. 3.8

D. 9.1

12. Determine the values of x ($x \neq 0$) such that the following infinite geometric series has a finite sum.

$$1 + \frac{1}{4}x + \frac{1}{16}x^2 + \frac{1}{64}x^3 + \dots$$

A. $-\frac{1}{4} < x < \frac{1}{4}$

B. $x < \frac{1}{4}$

C. $x > 4$

D. $-4 < x < 4$

13. Use sigma notation to write the geometric series $2 - 6 + 18 - \dots + 1458$.

A. $\sum_{k=1}^7 2(3)^k$

B. $\sum_{k=1}^7 2(-3)^{k-1}$

C. $\sum_{k=1}^7 2(3)^{k-1}$

D. $\sum_{k=1}^7 2(-3)^k$

14. A ball is dropped from a height of 2 m. On each bounce, the ball rises to 60% of the height from which it fell. Calculate the total vertical distance the ball travels before coming to rest.

A. 10 m

B. 5 m

C. 7 m

D. 8 m

15. If $\sum_{k=1}^{\infty} (\sin x)^{k-1} = 5$, determine x to the nearest degree. ($0^\circ \leq x \leq 90^\circ$)

A. 66°

B. 36°

C. 46°

D. 54°

16. If the sum of an infinite geometric series is 9 and the first term is 6, determine the common ratio.

A. $\frac{3}{2}$

B. $\frac{2}{3}$

C. $\frac{1}{3}$

D. $-\frac{1}{3}$

17. Solve for x : $\sum_{j=3}^5 (j-6)x = 72$

A. -72

B. -6

C. -12

D. -14.4

18. Evaluate: $\sum_{k=3}^{\infty} 12\left(-\frac{2}{3}\right)^{k-1}$

A. 36

B. 16

C. $\frac{16}{5}$

D. $\frac{36}{5}$

19. Evaluate: $\sum_{k=2}^4 \log_2 k$ (Accurate to 2 decimal places.)

A. 4.58

B. 3.17

C. 1.38

D. 1.08

20. Given that 2^x , 8^y , k is a geometric sequence, determine k .

A. 2^{3y-x}

B. 2^{6y-x}

C. 2^{2y-2x}

D. 2^{10y-5x}

21. Determine the sum of the first 12 terms of the series $\log_b 1 + \log_b 10 + \log_b 100 + \dots$

A. $\frac{72}{\log b}$

B. $\frac{66}{\log b}$

C. 72

D. 66

22. Given the geometric series $7 + 14 + 28 + 56 + \dots + 7168$

a) Find the number of terms.

b) Write the series using sigma (summation) notation.

23. A worker is paid \$0.03 on the first day, \$0.06 on the second day, \$0.12 on the third day, \$0.24 on the fourth day, and so on. How much money in total would be earned after working for 24 days?

24. If a person received a 10% salary increase at the end of each year and earned a total of \$91,576.50 during the first five years of work, determine the starting salary.

1. B
2. D
3. C
4. B
5. A
6. A
7. A
8. A
9. C
10. C
11. C
12. D
13. B
14. D
15. D
16. C
17. C
18. C
19. A
20. B

21. B
22. 11, $\sum_{n=1}^{11} 7(2)^{n-1}$
~~23~~ 23. 503,316.45
24. 15000

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