

TEST 45 SERIES (SECTIONS 11-4 THROUGH 11-6)

Directions: Write answers in the spaces provided. For each multiple-choice question, write the letter corresponding to the answer.

Section 11-4

Questions 1-2. Write each series in expanded form.

1. $\sum_{k=3}^7 \frac{k}{k-2}$ *Start @ 3 end @ 7* 2. $\sum_{k=1}^5 (-1)^{k+1} \cdot \frac{k}{k+1}$

Questions 3-5. Write each series in sigma notation.

3. $1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \frac{1}{5} - \dots + \frac{1}{n}$
 4. $2 + 2 \cdot 3 + 2 \cdot 3^2 + \dots + 2 \cdot 3^8$ *2 · 3^n*
 5. $-3 + 1 + 5 + \dots + 37$
 6. Which of the series in Questions 1-5 is arithmetic?
 7. Which of the series in Questions 1-5 is geometric?

Section 11-5

Questions 8-9. Find the sum of each arithmetic series described.

8. $\sum_{j=1}^{25} (2j + 1)$ 9. $n = 20, t_1 = -20, t_{20} = 50$

Questions 10-11. Find the sum of each geometric series described.

10. If $r = \frac{1}{3}$ and $t_1 = 120$, find S_6 .
 11. $\sum_{k=1}^5 \left(\frac{2}{3}\right)^{k-1}$

12. Find the first three terms of the arithmetic sequence where $t_1 = 120, t_n = 22$, and $S_n = 3550$. *n=50*
 13. Laura is repaying a debt of \$675 to her brother Chris by making weekly payments. If the first payment is \$10 and every succeeding payment is \$5 more than that of the preceding week, how long does it take Laura to pay off the debt?

Section 11-6

14. Which *one* of the following is an infinite geometric series?

- A. $1 + 4 + 7 + \dots$ B. $1 - 2 + 4 - 8$
 C. $1 - 2 + 4 - 8 + \dots$ D. $1 + \frac{1}{3} + \frac{1}{9} + \frac{1}{27}$
 E. $1 - 1 + 1 - 1 + 1$

ANSWERS

1. $3 + 2 + \frac{5}{3} + \frac{3}{2} + \frac{7}{5}$ (5)
 2. $\frac{1}{2} - \frac{2}{3} + \frac{3}{4} - \frac{4}{5} + \frac{5}{6}$ (5)
 3. $\sum_{n=1}^{\infty} \frac{1}{n}$ or $\sum_{n=0}^{\infty} \frac{1}{n+1}$ (5)
 4. $\sum_{n=0}^{\infty} 2 \cdot 3^n$ (5)
 5. $\sum_{n=1}^{\infty} 4n - 7$ (5)
 6. #5 (5)
 7. #4 (5)
 8. 675 (6)
 9. 300 (6)
 10. $\frac{14560}{81}$ (6)
 11. $\frac{211}{81}$ (6)
 12. ~~22~~ (6)
 13. 134 (6)
 14. C (5)

$\sum_{n=1}^{\infty} (-1)^{n+1} \left(\frac{1}{n}\right)$

118 116 114

Test 45 (continued)

15. Which one of the following infinite series has a sum?

A. $1 + 1 + 1 + \dots$ ~~(N)~~

B. $1 + 4 + 7 + \dots$ (A)

C. $1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots$ $r = \frac{1}{2}$

D. $1 - 2 + 3 - 4 + \dots$ (N)

16. Find the sum of the infinite series $1 - \frac{1}{3} + \frac{1}{9} - \frac{1}{27} + \dots$ Questions 17-18. Repeating decimals can be expressed as infinite geometric series. Consider the decimal $0.5555\dots$

17. Find the first three terms of the series. ✓

18. Find the sum and express it as a common fraction. ✓

19. A rubber ball is dropped from a height of 729 cm and rebounds on each bounce to a height that is $\frac{2}{3}$ of the previous bounce. How far will the ball travel before coming to rest?

ANSWERS

15. C (5)16. $\frac{3}{4}$ (5)17. $.5 + .05 + .005$ (4)18. $\frac{5}{9}$ (5)19. ~~_____~~ (5)