Multiple Choice Review Ch.11.1-11.3 & 11.6

1. Find the sum. $\sum_{i=4}^{18} 4$

   a. 72 b. 4 c. 13 d. 56 e. 60

2. Write the following sum. $\sum_{k=5}^{7} k(k+9)$

   a. $5(5+9)+6(6+9)+8(8+9)$

   b. $5(5+9)+7(7+9)$

   c. $6(6+9)+7(7+9)+8(8+9)$

   d. $5(5+9)+6(6+9)+7(7+9)$

   e. $6(6+9)+7(7+9)$

3. Find the common difference d of the arithmetic sequence.
   4, 6, 8, 10, ...
   a. 6 b. n c. 4 d. 2 e. $2n$

4. Find the partial sum S_n of the arithmetic sequence that satisfies the following conditions. $a_1 = 3$, $d = 5$, $n = 20$
   a. 103 b. 2020 c. 1010 d. 98 e. 1060

5. A partial sum of an arithmetic sequence is given. Find the sum. $-3+\left(-\frac{3}{2}\right)+0+\frac{3}{2}+...+15$

   a. 78 b. 42 c. 12 d. 60 e. 97.5

6. An architect designs a theater with 25 seats in the first row, 29 in the second, 33 in the third, and so on. If the theater is to have a seating capacity of 4,120, how many rows must the architect use in his design?
   a. 50 b. 42 c. 40 d. 45 e. 35

7. Determine whether the sequence is geometric.
   8, –4, 2, –1,... If it is geometric, find the common ratio.

   a. Geometric, $-\frac{1}{2}$ b. Geometric, –2

   c. Geometric, 2 d. Geometric, $\frac{1}{2}$

   e. Not geometric.

8. Find the first five terms of the sequence and determine if it is geometric. If it is geometric, find the common ratio.
   $a_n = 6(2)^n$
   a. 12, 24, 48, 96, 192; $r = 2$
   b. 12, 24, 48, 96, 194; $r = 3$
   c. 12, 24, 48, 96, 192; it is not geometric.
   d. 12, 24, 48, 96, 192; $r = 3$
   e. 12, 24, 48, 96, 194; $r = 2$

9. The common ratio in a geometric sequence is $\frac{5}{4}$, and the fourth term is $\frac{7}{4}$. Find the third term.

   a. $\frac{2}{5}$ b. $\frac{14}{5}$ c. $\frac{5}{7}$ d. $\frac{7}{5}$ e. $\frac{6}{4}$

10. Find the sum of the infinite geometric series.
    $1+\frac{1}{3}+\frac{1}{9}+\frac{1}{27}+....$

    a. 2 b. $\frac{2}{3}$ c. $\frac{3}{2}$ d. $\frac{5}{4}$ e. 1

11. Use Pascal's triangle to expand the expression $\left(x+\frac{3}{x}\right)^4$.

    a. $x^4+4x^2+9+\frac{108}{x^2}+\frac{81}{x^4}$

    b. $x^4+36x^2+9+\frac{108}{x^2}+\frac{81}{x^4}$

    c. $x^4+6x^2+18+\frac{54}{x^2}+\frac{81}{x^4}$

    d. $x^4+6x^2+18+\frac{54}{x^2}+\frac{81}{x^4}$

    e. $x^4+12x^2+54+\frac{108}{x^2}+\frac{81}{x^4}$

12. Use Pascal's triangle to expand the expression $(x-3)^5$.

    a. $x^5-15x^4+30x^3+270x^2+405x-243$
    b. $x^5-15x^4+72x^3-216x^2+405x-243$
    c. $x^5-15x^4-100x^3+270x^2+405x-243$
    d. $x^5-15x^4+90x^3+270x^2-405x-243$
    e. $x^5-15x^4+90x^3-270x^2+405x-243$

13. Use Pascal's triangle to expand the expression $(x^5y^7-1)^5$.

    a. $x^{25}y^{35}+5x^{20}y^{28}-10x^{15}y^{21}-10x^{10}y^{14}+5x^5y^7-1$
    b. $x^{25}y^{35}-5x^{20}y^{28}+8x^{15}y^{21}-10x^{10}y^{14}+5x^5y^7-1$
    c. $x^{25}y^{35}+4x^{20}y^{28}-8x^{15}y^{21}-8x^{10}y^{14}+4x^5y^7-1$
    d. $x^{25}y^{35}-5x^{20}y^{28}+10x^{15}y^{21}-10x^{10}y^{14}+5x^5y^7-1$
    e. $x^{25}y^{35}-5x^{20}y^{28}+10x^{15}y^{21}-10x^{10}y^{14}-2x^5y^7-1$

14. Evaluate the expression $\binom{10}{4}$.

    a. 5,042 b. 210 c. 5,040
    d. 2,310 e. 216

15. Find the 18th term in the expansion of $(A-B)^{21}$.

    a. $-5{,}985A^4B^{17}$ b. $-333A^4B^{17}$
    c. $-1{,}330A^5B^{17}$ d. $-210A^2B^{19}$
    e. $-23{,}940A^3B^{18}$

Short Answer

16. Find the sum. $\sum_{k=1}^{5} \frac{11}{k} =$

17. Write the sum without using sigma notation. $\sum_{i=3}^{7} \frac{2i-1}{2i+1}$

18. Write the sum without using sigma notation. $\sum_{i=1}^{7}\sqrt{k+2}$

19. Write the sum using sigma notation.
$\frac{1}{10\ln 10}-\frac{1}{11\ln 11}+\frac{1}{12\ln 12}-\frac{1}{13\ln 13}+\ldots+\frac{1}{96\ln 96}$

20. Determine the common difference, the fifth term, and the 100th term of the arithmetic sequence. $12,\ 12+s,\ 12+2s,\ 12+3s,\ \ldots$

21. Determine whether the sequence is geometric. If it is geometric, find the common ratio. 8, 4, 2, 1, ...

22. The common ratio in a geometric sequence is $\frac{5}{3}$, and the fifth term is 1. Find the first three terms.

23. A certain drug is administered once a day. The concentration of the drug in the patient's bloodstream increases rapidly at first, but each successive dose has less effect than the preceding one. The total amount of the drug (in mg) in the bloodstream after the *n*th dose is given by $\sum_{k=1}^{n}42\left(\frac{1}{4}\right)^{k-1}$.
    (a) Find the amount of the drug in the bloodstream after n = 2 days. Please round your answer to four decimal places.
    (b) If the drug is taken on a long-term basis, the amount in the bloodstream is approximated by the infinite series $\sum_{k=1}^{\infty}42\left(\frac{1}{4}\right)^{k-1}$. Find the sum of this series.

24. Use the Binomial Theorem to expand the expression. $\left(2A+B^2\right)^4$

25. Find the term containing x^4 in the expansion of $\left(x+2y\right)^{11}$

26. Find the partial sum S_7 of the sequence. 5, 10, 15, 20, ...

27. Find the partial sum S_5 of the sequence. 1, –1, 1, –1, ...

28. Find the *n*th term of the sequence. 2, 4, 8, 16, ...

Write out the first 4 terms

29. $a_n=2^n$

30. $a_n=\frac{(-1)^n}{n^2}$

31. $a_n=\frac{n}{n+1}$

32. $a_n=\frac{n^2+1}{n!}$

Find the rule for the following:

33. 1, 4, 7, 10, ….

34. $2,\ -1,\frac{1}{2},-\frac{1}{4},\ldots$

35. $\frac{1}{2\cdot 3},\frac{2}{3\cdot 4},\ \frac{3}{4\cdot 5},\ldots$

36. $-\frac{1}{2},\frac{1}{3},-\frac{2}{9},\frac{4}{27},\ldots$

37. 1, 2, 6, 24, 120, …

Find the 42nd term.

38. $a_n=2n-10$

39. $a_n=\frac{1+(-1)^n}{n}$

40. $a_n=\frac{2n!}{(n+1)!}$

41. $\frac{-1}{2},0,\frac{1}{4},\frac{2}{5},\ldots$

Find the sum of the following series, if possible.

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

43. $\sum_{n=3}^{5}(-1)^{n+2}(2n)$

44. $\sum_{n=1}^{\infty}3\left(\frac{3}{4}\right)^{n-1}$

45. $\sum_{n=1}^{\infty}2\left(-\frac{1}{5}\right)^{n}$

46. $2-1+\frac{1}{2}-\frac{1}{4}+\ldots$

47. 3+7+11+15+…+79

Answers

1. E
2. D
3. D
4. C
5. A
6. C
7. A
8. A
9. D
10. C
11. E
12. E
13. D
14. B
15. A
16. $\frac{1507}{60}$
17. $\frac{5}{7}+\frac{7}{9}+\frac{9}{11}+\frac{11}{13}+\frac{13}{15}$
18. $\sqrt{3}+\sqrt{4}+\sqrt{5}+\sqrt{6}+\sqrt{7}+\sqrt{8}+\sqrt{9}$
19. $\sum_{k=10}^{96}\frac{(-1)^k}{k\ln k}$
20. s; $12 + 4s$; $12 + 99s$
21. $\frac{1}{2}$
22. $a_1=\frac{81}{625}$, $a_2=\frac{27}{125}$, $a_3=\frac{9}{25}$
23. 10.5; 56
24. $16A^4+32A^3B^2+24A^2B^4+8AB^6+B^8$
25. $42240x^4y^7$
26. $S_7 = 140$
27. $S_5 = 1$
28. $a_n = 2^n$
29. 2, 4, 8, 16
30. $\frac{-1}{1}, \frac{1}{4}, \frac{-1}{9}, \frac{1}{16}$
31. $\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}$
32. $\frac{2}{1}, \frac{5}{2}, \frac{10}{6}, \frac{17}{24}$
33. $a_n = 3n - 2$
34. $a_n=2\left(-\frac{1}{2}\right)^{n-1}$
35. $a_n=\frac{n}{(n+1)(n+2)}$
36. $a_n=-\frac{1}{2}\left(-\frac{2}{3}\right)^{n-1}$
37. $a_n = n!$
38. 74
39. $\frac{2}{42}=\frac{1}{21}$
40. $\frac{2}{43}$
41. $a_n=\frac{n-2}{n+1}\Rightarrow a_{42}=\frac{40}{43}$
42. 170
43. -8
44. 12
45. $-\frac{1}{3}$
46. $\frac{4}{3}$
47. 820