

Sequences and Series Homework Problems

Write the first four terms of each sequence whose general term is given:

1. $a_n = 3n + 2$

2. $a_n = 3^n$

3. $a_n = \left(-\frac{1}{3}\right)^n$

4. $a_n = (-1)^n(n + 3)$

5. $a_n = \frac{2n}{n+4}$

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

7. $a_n = \frac{n^2}{n!}$

8. $a_n = 2(n + 1)!$

Find each indicated sum:

9. $\sum_{i=1}^6 5i$

10. $\sum_{i=1}^4 2i^2$

11. $\sum_{k=1}^5 k(k + 4)$

12. $\sum_{i=1}^4 \left(-\frac{1}{2}\right)^i$

13. $\sum_{i=5}^9 11$

14. $\sum_{i=0}^4 \frac{(-1)^i}{i!}$

15. $\sum_{i=1}^5 \frac{i!}{(i-1)!}$

Express each sum using summation notation. Use 1 as the lower limit of summation and i for the index of summation.

16. $1^2 + 2^2 + 3^2 + \dots + 15^2$

17. $2 + 2^2 + 2^3 + \dots + 2^{11}$

18. $1 + 2 + 3 + \dots + 30$

19. $\frac{1}{2} + \frac{2}{3} + \frac{3}{4} + \dots + \frac{14}{15}$

20. $4 + \frac{4^2}{2} + \frac{4^3}{3} + \dots + \frac{4^n}{n}$

21. $1 + 3 + 5 + \dots + (2n - 1)$

22. $1 + 4 + 9 + 16 + 25 + \dots + 81$

Answers:

1. 5, 8, 11, 14

2. 3, 9, 21, 81

3. $-\frac{1}{3}, \frac{1}{9}, -\frac{1}{27}, \frac{1}{81}$

4. -4, 5, -6, 7

5. $\frac{2}{5}, \frac{2}{3}, \frac{6}{7}, 1$

6. $1, -\frac{1}{3}, \frac{1}{7}, -\frac{1}{15}$

7. $1, 2, \frac{3}{2}, \frac{2}{3}$

8. 4, 12, 48, 240

9. 105

10. 60

11. 115

12. $-\frac{5}{16}$

13. 55

14. $\frac{3}{8}$

15. 15

16. $\sum_{i=1}^{15} i^2$

17. $\sum_{i=2}^{11} 2^i$

18. $\sum_{i=1}^{30} i$

19. $\sum_{i=1}^{14} \frac{i}{i+1}$

20. $\sum_{i=1}^n \frac{4^i}{i}$

21. $\sum_{i=1}^n (2i - 1)$

22. $\sum_{i=1}^9 i^2$