

Section 3.1: Sequences and Series

Solutions

1. 12, 10, 8 (pattern is to subtract 2)

2. 25, 36, 49 (n th term is equal to n^2)

3. 192, 384, 768 (multiply by 2)

4. $\frac{9}{4}, \frac{9}{16}, \frac{9}{64}$ (divide by 4)

5. $\sqrt{7}, 2\sqrt{2}, 3$ (n th term is \sqrt{n})

6. -40, 80, -160 (multiply by -2)

7. 61, 73, 85 (add 12)

8. $\frac{1}{6}, \frac{1}{7}, \frac{1}{8}$

9. $a_n = n^2$

10. $a_n = \sqrt{n}$

11. $a_n = 2n$

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

13. 2, 7, 12, 17

14. 10, 30, 90, 270

15. 2, 3, 6, 18

16. $2, \frac{3}{2}, \frac{5}{3}, \frac{8}{5}$

17. -2, 1, 4, 7

18. $\frac{1}{3}, 1, 3, 9$

19. 1, 2, 6, 24

$$20. 1, \frac{1}{4}, \frac{1}{9}, \frac{1}{16}$$

$$21. a_7 = 1280$$

$$22. a_{100} = 415$$

$$23. a_{2500} = \frac{2502}{2501}$$

$$24. a_{10} = 2000$$

$$25. S_3 = 18, S_6 = 63$$

$$26. S_3 = 14, S_6 = 91$$

$$27. S_3 = 15, S_6 = -105$$

$$28. S_3 = 9, S_6 = 0$$

$$29. \sum_{n=3}^7 n = 3 + 4 + 5 + 6 + 7 = 25$$

$$30. \sum_{j=4}^{10} (-1)^j = 1 + (-1) + 1 + (-1) + 1 + (-1) + 1 = 1$$

$$31. \sum_{i=0}^4 2^i = 2^0 + 2^1 + 2^2 + 2^3 + 2^4 = 1 + 2 + 4 + 8 + 16 = 31$$

$$32. \sum_{k=20}^{25} 3k - 10 = 50 + 53 + 56 + 59 + 62 + 65 = 345$$

$$33. \sum_{i=1}^{10} i^3$$

$$34. \sum_{j=2}^{\infty} \frac{1}{j}$$

$$35. \sum_{k=1}^{\infty} 2k$$

$$36. \sum_{k=1}^4 2k$$

37. You could either do $\begin{cases} a_1 = 1 \\ a_n = (\sqrt{a_{n-1}} + 1)^2 \end{cases}$ or another possibility is $\begin{cases} a_1 = 1 \\ a_n = a_{n-1} + 2n - 1 \end{cases}$

38. $a_n = n!$

39. The next term is 200,000. $\begin{cases} a_1 = 4 \\ a_2 = 5 \\ a_n = a_{n-1} \times a_{n-2} \end{cases}$