

Sequences and Series - ANSWERS

S.1 Exercises

1. sequence
5. Sigma
9. $-1, 1, 3, 5, a_{10} = 17$
13. $-1, \frac{1}{4}, -\frac{1}{9}, \frac{1}{16}, a_{10} = \frac{1}{100}$
17. $1, -\frac{1}{3}, \frac{1}{5}, -\frac{1}{7}, a_{10} = -\frac{1}{19}$
21. $a_n = 3^n$
25. $a_n = \frac{(-1)^{n+1}}{n^3}$ or $a_n = \frac{(-1)^{n-1}}{n^3}$
29. 1, 2, 5, 12, 29
31. \$232, \$228, \$224, \$220, \$216, \$212; remaining debt = \$400
33. $a_n = 200n + 300, a_{10} = 2300$
35. a. $a_n = (0.8)^n \cdot a_0,$
- b.
- | day | level of chlorine in ppm |
|-----|--------------------------|
| 0 | 7 |
| 1 | 5.6 |
| 2 | 4.48 |
| 3 | 3.584 |
| 4 | 2.8672 |
- So, the level of chlorine drops below 3 ppm on the fourth day.
37. 50
39. 4
41. 248
43. $\frac{13}{60}$
45. $\sum_{i=1}^6 2i$
47. $\sum_{i=2}^{50} \frac{(-1)^i}{i}$
49. $\sum_{i=1}^{\infty} i^3$
51. $\sum_{m=1}^{10} (3m - 4)$
53. $\sum_{m=1}^5 \frac{m+1}{m+3}$
55. $\sum_{m=1}^{\infty} (-1)^{m+1} m$
57. $\sum_{i=1}^9 \frac{1}{2^i}$
59. 10
61. 0

S.2 Exercises

1. arithmetic
5. partial sum, sigma
9. true
13. $a_n = 2n - 6$
17. 3, 1, -1, -3, -5; $a_{12} = -19$
21. 10, 8, 6, 4, 2; $a_{12} = -12$
25. 13
27. 17
29. $a_8 = 23$
31. $a_{50} = 197$
33. $a_{10} = -71$
35. $a_1 = 7$
37. $S_{12} = 138$
39. $S_9 = -54$
41. $S_{10} = 175$
43. 325
45. 459
47. 75
49. -725
51. 1800°
53. a. 82 min = 1 h 22 min b. 13.5 h
55. a. $a_n = 200n + 300$ b. \$2300 c. \$25200

S.3 Exercises

1. ratio
3. $a_1 r^{n-1}$
5. geometric mean
7. false
9. true
11. yes; $a_n = 5^{n-1}$
13. not geometric
15. yes; $a_n = 0.9(0.1)^{n-1}$
17. yes; $a_n = \frac{2^{n-1}}{3}$
19. 3, 6, 12, 24; $a_8 = 384$
21. $6, 2, \frac{2}{3}, \frac{2}{9}$; $a_8 = \frac{2}{729}$
23. $\frac{1}{3}, -\frac{1}{6}, \frac{1}{12}, -\frac{1}{24}$; $a_8 = -\frac{1}{384}$
25. 11
27. 8
29. 6
31. $a_5 = 0.04$
33. $a_{50} = -2$
35. $a_8 = -\frac{2}{729}$
37. $a_4 = \frac{1}{4}$
39. ~ 13.683
41. 6560
43. ~ 1.250
45. ~ 16.284
47. $S_\infty = \frac{3}{2}$
49. S_∞ doesn't exist
51. $S_\infty = 2.5$
53. S_∞ doesn't exist
55. \$46,539.85
57. \$2,716,460.07
59. a. 86 cm b. 11 m 39 cm
61. 2 square units