

# Sequences and Series - ANSWERS

## S1 Exercises

1.  $-1, 1, 3, 5, a_{10} = 17$
3.  $3, -6, 9, -12, a_{10} = -30$
5.  $-1, \frac{1}{4}, -\frac{1}{9}, \frac{1}{16}, a_{10} = \frac{1}{100}$
7.  $-1, 0, -1, 4, a_{10} = 64$
9.  $1, -\frac{1}{3}, \frac{1}{5}, -\frac{1}{7}, a_{10} = -\frac{1}{19}$
11.  $a_n = (-1)^{n+1}$  or  $a_n = (-1)^{n-1}$
13.  $a_n = 3^n$
15.  $a_n = 3n + 3$
17.  $a_n = \frac{(-1)^{n+1}}{n^3}$  or  $a_n = \frac{(-1)^{n-1}}{n^3}$
19.  $-3, -1, 3, 11, 27$
21.  $1, 2, 5, 12, 29$
23.  $\$252, \$248, \$244, \$240, \$236$ ; remaining balance =  $\$1600$
25.  $p_n = 0.2 + 0.3n$ ;  $p_{14} = \$4.40$
27. a.  $a_n = 3(.75)^n$   
b. 4<sup>th</sup> day
29. 50
31. 4
33. 248
35.  $\frac{13}{60}$
37.  $\sum_{i=1}^6 2i$
39.  $\sum_{i=2}^{50} \frac{(-1)^i}{i}$
41.  $\sum_{i=1}^{\infty} i^3$
43.  $\sum_{m=1}^{10} (3m - 4)$
45.  $\sum_{m=1}^5 \frac{m+1}{m+3}$
47.  $\sum_{m=1}^{\infty} (-1)^{m+1} m$
49.  $\frac{2}{3}, \left(\frac{2}{3}\right)^2, \left(\frac{2}{3}\right)^3; \sum_{i=1}^6 \left(\frac{2}{3}\right)^i$
51. 10
53. 0

## S2 Exercises

1. true
3. true
5.  $a_n = 2n - 1$
7.  $a_n = 2n - 6$
9.  $a_n = \frac{1}{2}n - \frac{5}{2}$
11.  $3, 1, -1, -3, -5; a_{12} = -19$
13.  $-8, -4, 0, 4, 8; a_{12} = 36$
15.  $10, 8, 6, 4, 2; a_{12} = -12$
17. 15
19. 13
21. 17
23.  $a_8 = 23$
25.  $a_{50} = 197$
27.  $a_{10} = -71$
29.  $a_1 = 7$
31.  $S_{12} = 138$

33.  $S_9 = -54$

35.  $S_{10} = 175$

37. 325

39. 459

41. 75

43.  $-725$

45.  $1800^\circ$

47. a. 1 hr 20 min

b. 11 hr 5 min

49. a. 2 hr 04 min    b. 17 hr 46 min

### S3 Exercises

1. true

3. true

5. not geometric

7. yes;  $a_n = \frac{(-1)^n}{3^{n-3}}$ 9. yes;  $a_n = (-1)^{n-1}$ 11. yes;  $a_n = \frac{(-1)^{n-1}}{3^{n-5}}$ 13. yes;  $a_n = -\frac{4^{n-2}}{5^{n-1}}$ 15.  $-\frac{1}{2}, \frac{1}{4}, -\frac{1}{8}, \frac{1}{16}$ ;  $a_8 = \frac{1}{256}$ 17. 5, -5, 5, -5;  $a_8 = -5$ 19. 100, 10, 1, 0.1;  $a_8 = 0.00001$ 

21. 10

23. 7

25. 9

27.  $a_{10} = 256$ 29.  $a_{12} = \frac{1}{512}$ 31.  $a_9 = 729$ 33.  $a_{10} = -1536$ 35.  $\sim -2.667$ 37.  $\sim 11.997$ 39.  $-14762$ 

41. 3069

43.  $S_\infty$  doesn't exist45.  $S_\infty = 5$ 47.  $S_\infty$  doesn't exist49.  $S_\infty = -\frac{6}{7}$ 

51. \$819.20; \$1638.30

53. \$25,357.18

55. 12 meters