132. (a) $A - B = \begin{bmatrix} -3 & -7 & 4 \\ 4 & 4 & 1 \\ 1 & 4 & 3 \end{bmatrix}$

(c) $AB = \begin{bmatrix} -2 & 7 & -16 \\ 4 & 42 & 45 \\ 1 & 23 & 48 \end{bmatrix}$

(b) $2B - 3A = \begin{bmatrix} 8 & 17 & -14 \\ -12 & -13 & -9 \\ -3 & -15 & -10 \end{bmatrix}$

(d) $BA = \begin{bmatrix} 16 & 31 & 42 \\ 10 & 47 & 31 \\ 13 & 22 & 25 \end{bmatrix}$

134. $\begin{vmatrix} 3 & 7 \\ -2 & 9 \end{vmatrix} = 27 + 14 = 41$

136. $\begin{vmatrix} 4 & 0 & 5 \\ 0 & -7 & 2 \\ 9 & 1 & -1 \end{vmatrix} = 4(7 - 2) + 5(0 + 63) = 335$

Section 9.2   Arithmetic Sequences and Partial Sums

Solutions to Even-Numbered Exercises

2. $4, 9, 14, 19, 24, \ldots$

Arithmetic sequence, $d = 5$

4. $\frac{1}{3}, \frac{2}{3}, \frac{4}{3}, \frac{8}{3}, \frac{16}{3}, \ldots$

Not an arithmetic sequence

6. $\ln 1, \ln 2, \ln 3, \ln 4, \ln 5, \ldots$

Not an arithmetic sequence

8. $1^2, 2^2, 3^2, 4^2, 5^2, \ldots$

Not an arithmetic sequence

10. $a_n = (2^n)n$

$2, 8, 24, 64, 160$

Not an arithmetic sequence

12. $a_n = 1 + (n - 1)4$

$1, 5, 9, 13, 17$

Arithmetic sequence, $d = 4$

14. $a_n = 2^{n-1}$

$1, 2, 4, 8, 16$

Not an arithmetic sequence

16. $a_n = (-1)^n$

$-1, 1, -1, 1, -1$

Not an arithmetic sequence

18. $a_1 = 200, \; a_{k+1} = a_k - 20$

$a_2 = 200 - 20 = 180$

$a_3 = 180 - 20 = 160$

$a_4 = 160 - 20 = 140$

$a_5 = 140 - 20 = 120$

$d = -20$ and $a_n = 220 - 20n$

20. $a_1 = 0.375, \; a_{k+1} = a_k + 0.25$

$a_2 = 0.375 + 0.25 = 0.625$

$a_3 = 0.625 + 0.25 = 0.875$

$a_4 = 0.875 + 0.25 = 1.125$

$a_5 = 1.125 + 0.25 = 1.375$

$d = 0.25, \; a_n = 0.125 + 0.25n$

22. $a_1 = 5, d = -\frac{3}{4}$

$a_1 = 5$

$a_2 = 5 - \frac{3}{4} = \frac{17}{4}$

$a_3 = \frac{17}{4} - \frac{3}{4} = \frac{14}{4} = \frac{7}{2}$

$a_4 = \frac{7}{2} - \frac{3}{4} = \frac{11}{4}$

$a_5 = \frac{11}{4} - \frac{3}{4} = \frac{8}{4} = 2$

24. $a_4 = 16, a_{10} = 46$

$16 = a_4 = a_1 + (n - 1)d = a_1 + 3d$

$46 = a_{10} = a_1 + (n - 1)d = a_1 + 9d$

Answer: $a_1 = 1, d = 5$

$a_1 = 1$

$a_2 = 1 + 5 = 6$

$a_3 = 6 + 5 = 11$

$a_4 = 11 + 5 = 16$

$a_5 = 16 + 5 = 21$

26. $a_{11} = a_6 + 5d$

$-73 = -38 + 5d \Longrightarrow d = -7$

$a_6 = a_1 + 5d \Longrightarrow -38 = a_1 + 5(-7) \Longrightarrow a_1 = -3$

$a_2 = -3 - 7 = -10$

$a_3 = -10 - 7 = -17$

$a_4 = -17 - 7 = -24$

$a_5 = -24 - 7 = -31$

28. $a_{14} = a_5 + 9d$

$38.5 = 16 + 9d \Longrightarrow d = 2.5$

$a_5 = a_1 + 4d \Longrightarrow 16 = a_1 + 4(2.5) \Longrightarrow a_1 = 6$

$a_2 = 6 + 2.5 = 8.5$

$a_3 = 8.5 + 2.5 = 11$

$a_4 = 11 + 2.5 = 13.5$

$a_5 = 13.5 + 2.5 = 16$

30. $a_2 = a_1 + d$

$13 = 3 + d \Longrightarrow d = 10$

$a_9 = a_1 + 8d = 3 + 8(10) = 83$

32. $d = a_2 - a_1 = -10 - (-1) = -9$

$a_{25} = a_1 + 24d = -1 + 24(-9) = -217$

34. $d = a_2 - a_1 = -13.8 - (-0.7) = -13.1$

$a_8 = a_1 + 7d = -0.7 + 7(-13.1) = -92.4$

36. $a_1 = 15, d = 4$

$a_n = a_1 + (n-1)d = 15 + (n-1)4 = 11 + 4n$

38. $a_1 = 0, d = -\frac{2}{3}$

$a_n = a_1 + (n-1)d = (n-1)\left(-\frac{2}{3}\right) = \frac{2}{3} - \frac{2}{3}n$

40. $10, 5, 0, -5, -10, \ldots$

$d = -5$

$a_n = a_1 + (n-1)d = 10 + (n-1)(-5) = 15 - 5n$

42. $a_1 = -4, a_5 = 16$

$a_n = a_1 + (n-1)d$

$16 = -4 + 4d$

$d = 5$

$a_n = a_1 + (n-1)d = -4 + (n-1)5 = 5n - 9$

44. $a_5 = 190, a_{10} = 115$

$a_{10} = a_5 + 5d \Longrightarrow 115 = 190 + 5d \Longrightarrow d = -15$

$a_1 = a_5 - 4d \Longrightarrow a_1 = 190 - 4(-15) = 250$

$a_n = a_1 + (n-1)d = 250 + (n-1)(-15)$

$\qquad\qquad = 265 - 15n$

46. $a_n = 3n - 5$

$d = 3$ so the sequence is increasing.

and $a_1 = -2$.
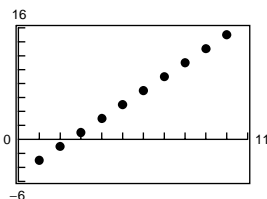
Matches (d).

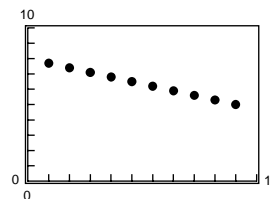**48.** $a_n = 25 - 3n$

$d = -3$ so the sequence is decreasing.

and $a_1 = 22$.

Matches (a).

50. $a_n = -5 + 2n$

52. $a_n = -0.3n + 8$

54. $a_n = 17 + 3n$

n	1	2	3	4	5	6	7	8	9	10
a_n	20	23	26	29	32	35	38	41	44	47

56. $a_n = \frac{4}{5}n + 12$

n	1	2	3	4	5	6	7	8	9	10
a_n	12.8	13.6	14.4	15.2	16	16.8	17.6	18.4	19.2	20

58. $a_n = -12.4n + 9$

n	1	2	3	4	5	6	7	8	9	10
a_n	-3.4	-15.8	-28.2	-40.6	-53	-65.4	-77.8	-90.2	-102.6	-115

60. $-6, -2, 2, 6, \ldots$

$a_1 = -6, d = 4, n = 50$

$a_{50} = -6 + 49(4) = 190$

$S_{50} = \frac{50}{2}(-6 + 190) = 4600$

62. $40, 29, 18, 7, \ldots$

$a_1 = 40, d = -11, n = 10$

$a_{10} = 40 + 9(-11) = -59$

$S_{10} = \frac{10}{2}(40 - 59) = -95$

64. $a_1 = 15, a_{100} = 307, n = 100$

$S_{100} = \frac{100}{2}(15 + 307) = 16,100$

66. $a_n = 2n$

$a_1 = 2, a_{100} = 200, n = 100$

$\sum_{n=1}^{100} 2n = \frac{100}{2}(2 + 200) = 10,100$

68. $a_n = 7n$

$a_{51} = 357, a_{100} = 700$

$\sum_{n=51}^{100} 7n = \frac{50}{2}(357 + 700) = 26,425$

70. $\sum_{n=51}^{100} n - \sum_{n=1}^{50} n = \frac{50}{2}(51 + 100) - \frac{50}{2}(1 + 50) = 3775 - 1275 = 2500$

72. $a_n = 1000 - n$

$a_1 = 999, a_{250} = 750, n = 250$

$\sum_{n=1}^{250} (1000 - n) = \frac{250}{2}(999 + 750) = 218,625$

74. $a_1 = \frac{5}{2}, a_{100} = 52, n = 100$

$\sum_{n=1}^{100} \frac{n + 4}{2} = \frac{100}{2}\left(\frac{5}{2} + 52\right) = 2725$

76. $a_0 = \frac{1}{2}, a_{100} = -18\frac{1}{4}, n = 101$

$\sum_{n=0}^{100} \frac{8 - 3n}{16} = \frac{101}{2}\left(\frac{1}{2} - 18\frac{1}{4}\right) = -896.375$

78. $a_1 = 4.525, a_{200} = 9.5, n = 200$

$\sum_{j=1}^{200} (4.5 + 0.025j) = \frac{200}{2}(4.525 + 9.5) = 1402.5$

80. $a_1 = -10, a_{61} = 50, n = 61$

$\sum_{i=0}^{61} (i - 10) = \frac{61}{2}(-10 + 50) = 1220$

82. (a) $a_1 = 36,800, d = 1750$

$a_6 = a_1 + 5d = 36,800 + 5(1750) = \$45,550$

(b) $S_6 = \frac{6}{2}[36,800 + 45,550] = \$247,050$

84. $a_1 = 15, d = 3, n = 36$

$a_{36} = 15 + 35(3) = 120$

$S_{36} = \frac{36}{2}(15 + 120) = 2430$ seats

86. $a_1 = 15, a_{10} = 24, d = 1, n = 10$

$S_{10} = \frac{10}{2}(15 + 24) = 195$ logs

88. $a_1 = 93, d = 89 - 93 = -4, n = 8$

$a_8 = -4(8) + 97 = 65$

$S_8 = \frac{8}{2}(93 + 65) = 4(158) = 632$ bales

90. $a_1 = 4.9, a_2 = 14.7, a_3 = 24.5,$

$a_4 = 34.3 \Longrightarrow d = 9.8$

$a_1 = 4.9 = 9.8(1) + c \Longrightarrow c = -4.9$

$a_n = 9.8n - 4.9$

$a_{10} = 9.8(10) - 4.9 = 93.1$

$S_{10} = \frac{10}{2}(4.9 + 93.1) = 490$ meters