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## Section 9.2

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6.  $4, 9, 14, 19, 24, \dots$

Arithmetic sequence  $d = 5$

9.  $\frac{9}{4}, 2, \frac{7}{4}, \frac{3}{2}, \frac{5}{4}, \dots$

Arithmetic sequence,  $d = -\frac{1}{4}$

12.  $5.3, 5.7, 6.1, 6.5, 6.9, \dots$

Arithmetic sequence,  $d = 0.4$

15.  $a_n = 5 + 3n$

$8, 11, 14, 17, 20$

Arithmetic sequence,  $d = 3$

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

$1, 5, 9, 13, 17$

Arithmetic sequence,  $d = 4$

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

$-3, \frac{3}{2}, -1, \frac{3}{4}, -\frac{3}{5}$

Not an arithmetic sequence

24.  $a_1 = 15, d = 4$

$$\begin{aligned}a_n &= a_1 + (n - 1)d = 15 + (n - 1)4 \\&= 4n + 11\end{aligned}$$

27.  $4, \frac{3}{2}, -1, -\frac{7}{2}, \dots$

$d = -\frac{5}{2}$

$$a_n = a_1 + (n - 1)d = 4 + (n - 1)\left(-\frac{5}{2}\right) = -\frac{5}{2}n + \frac{13}{2}$$

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

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

$$16 = -4 + 4d$$

$$d = 5$$

$$\begin{aligned}a_n &= a_1 + (n - 1)d = -4 + (n - 1)5 \\&= 5n - 9\end{aligned}$$

33.  $a_1 = 5, d = 6$

$$a_1 = 5$$

$$a_2 = 5 + 6 = 11$$

$$a_3 = 11 + 6 = 17$$

$$a_4 = 17 + 6 = 23$$

$$a_5 = 23 + 6 = 29$$

36.  $a_1 = 16.5, d = 0.25$

$$a_1 = 16.5$$

$$a_2 = 16.5 + 0.25 = 16.75$$

$$a_3 = 16.75 + 0.25 = 17$$

$$a_4 = 17 + 0.25 = 17.25$$

$$a_5 = 17.25 + 0.25 = 17.5$$

39.  $a_8 = 26, a_{12} = 42$

$$a_{12} = a_8 + 4d$$

$$42 = 26 + 4d \Rightarrow d = 4$$

$$a_8 = a_1 + 7d$$

$$26 = a_1 + 28 \Rightarrow a_1 = -2$$

$$a_1 = -2$$

$$a_2 = -2 + 4 = 2$$

$$a_3 = 2 + 4 = 6$$

$$a_4 = 6 + 4 = 10$$

$$a_5 = 10 + 4 = 14$$

42.  $a_1 = 6, a_{n+1} = a_n + 5$

$$a_2 = 6 + 5 = 11$$

$$a_3 = 11 + 5 = 16$$

$$a_4 = 16 + 5 = 21$$

$$a_5 = 21 + 5 = 26$$

45.  $a_1 = \frac{5}{8}, a_{n+1} = a_n - \frac{1}{8}$

$$a_1 = \frac{5}{8}$$

$$a_2 = \frac{5}{8} - \frac{1}{8} = \frac{1}{2}$$

$$a_3 = \frac{1}{2} - \frac{1}{8} = \frac{3}{8}$$

$$a_4 = \frac{3}{8} - \frac{1}{8} = \frac{1}{4}$$

$$a_5 = \frac{1}{4} - \frac{1}{8} = \frac{1}{8}$$

48.  $a_1 = 3, a_2 = 13$

$$d = a_2 - a_1 = 13 - 3 = 10$$

$$a_n = dn + c, a_n = 10n + c$$

$$c = a_1 - d = 3 - 10 = -7$$

$$a_n = 10n - 7, a_9 = 10(9) - 7 = 83$$

51.  $S_{10} = \frac{10}{2}(2 + 20) = 110$

54.  $S_6 = \frac{6}{2}(-5 + 5) = 0$

57.  $S_{131} = \frac{131}{2}(-100 + 30) = -4585$

60.  $-6, -2, 2, 6, \dots, n = 50$

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

$$a_{50} = -6 + (50 - 1)4 = 190$$

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

63.  $40, 37, 34, 31, \dots$

$$a_1 = 40, d = -3, n = 10$$

$$a_{10} = 40 + 9(-3) = 13$$

$$S_{10} = \frac{10}{2}(40 + 13) = 265$$

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

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

69.  $a_{10} = 60, a_{100} = 600, n = 91$

$$\sum_{n=10}^{100} 6n = \frac{91}{2}(60 + 600) = 30,030$$

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

75.  $a_n = -\frac{3}{4}n + 8$

$d = -\frac{3}{4}$  so the sequence is decreasing and  $a_1 = 7\frac{1}{4}$

Matches (b).

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## Section 9.2

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91.  $a_1 = 20, d = 4, n = 30$

$$a_{30} = 20 + 29(4) = 136$$

$$S_{30} = \frac{30}{2}(20 + 136) = 2340 \text{ seats}$$

93.  $a_1 = 14, a_{18} = 31$

$$S_{18} = \frac{18}{2}(14 + 31) = 405 \text{ bricks}$$

95.  $4.9, 14.7, 24.5, 34.3, \dots$

$$d = 9.8$$

$$a_{10} = 4.9 + 9(9.8) = 93.1 \text{ meters}$$

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

97. (a)  $a_1 = 200, a_2 = 175 \Rightarrow d = -25$

$$c = 200 - (-25) = 225$$

$$a_n = -25n + 225$$

(b)  $a_8 = -25(8) + 225 = 25$

$$S_8 = \frac{8}{2}(200 + 25) = \$900$$