

Solutions for practice in 6.2 Arithmetic Sequences and Series

1. If $a_4 = 12$ and $a_7 = 3$ in an arithmetic sequence, write the first seven terms of the sequence.

$$\begin{array}{l} a_4 = 12 \\ a_5 = \\ a_6 = \\ a_7 = 3 \end{array} \left. \begin{array}{l}) \text{ same diff} \\) \text{ same diff} \\) \text{ same diff} \end{array} \right\} \begin{array}{l} \text{total diff} \\ \text{is } 9, \text{ so each diff} \\ \text{is } \frac{9}{3} = 3 \end{array}$$

$$a_7 = 3 \quad a_6 = 6 \quad a_5 = 9 \quad a_4 = 12$$

$$a_3 = 15 \quad a_2 = 18 \quad a_1 = 21$$

2. Determine the 80th term and the sum of 80 terms of this sequence: 18, 13, 8, 3, ...

$$a_1 = 18$$

$$d = -5$$

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

$$\begin{aligned} a_{80} &= 18 + (80-1) \cdot (-5) \\ &= 18 - 80 \cdot 5 + 5 \\ &= 23 - 400 \\ &= -377 \end{aligned}$$

$$S_n = \frac{n}{2} (a_1 + a_n)$$

$$\begin{aligned} S_{80} &= \frac{80}{2} (18 - 377) = \\ &= 40 \cdot (-359) = \\ &= -14360 \end{aligned}$$

3. Write in sigma notation and find the indicated nth partial sum of this arithmetic sequence: 0.5, 0.9, 1.3, 1.7, ..., $n = 10$

$$\begin{aligned}
 a_1 &= 0.5 \\
 d &= 0.4 \\
 \sum_{i=1}^{10} (0.5 + (i-1)0.4) &= \\
 &= \frac{10}{2} [0.5 + 0.5 + 9 \cdot 0.4] = 5(1 + 3.6) \\
 &= 5 \cdot 4.6 = 23
 \end{aligned}$$

4. $\sum_{k=1}^4 2k - 3 = (2 \cdot 1 + 2 \cdot 2 + 2 \cdot 3 + 2 \cdot 4) - 3$
 $= (2 + 4 + 6 + 8) - 3 = 20 - 3 = 17$

5. In the last lesson, you decided to save for your trip to Europe. You opened a savings account with \$1.00 and on each subsequent day, you deposited a dollar more than on the previous day. How much have you contributed by the end of one year?

$$a_1 = 1$$

$$a_2 = 2$$

$$a_3 = 3$$

$$a_4 = 4$$

⋮

$$a_n = n$$

We want to know S_{365}

$$S_{365} = \frac{365}{2} [2 \cdot 1 + 364 \cdot 1]$$

\uparrow \uparrow \swarrow
 a_1 $(365-1)$ d

$$= \frac{365}{2} \cdot 366 = 365 \cdot 183$$

$$= 66795$$