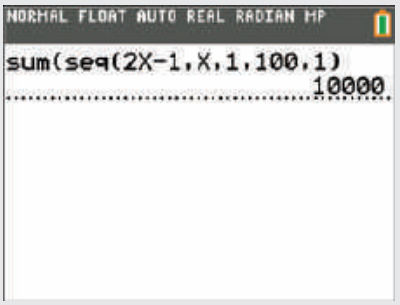
**TECHNOLOGY**




Thus, we have $a_1 = 1$, $d = 2$, $n = 100$, and $a_n = a_{100} = 2(100) - 1 = 199$. Given this information, we can use either partial sum formula to find the answer.

Using the first formula, $S_{100} = 100(1) + 2\left(\dfrac{(100-1)(100)}{2}\right)$

$$= 100 + 2\left(\frac{99 \cdot 100}{2}\right) = 10{,}000.$$

Using the second formula, $S_{100} = \left(\dfrac{100}{2}\right)(1+199) = 50 \cdot 200 = 10{,}000.$

## 13.2 EXERCISES

### PRACTICE

Find the explicit formula for the general $n^{\text{th}}$ term of each arithmetic sequence. See Example 1.

**1.** $-2, 1, 4, 7, 10, \ldots$

**2.** $5, 7, 9, 11, 13, \ldots$

**3.** $7, 5, 3, 1, -1, \ldots$

**4.** $a_2 = 14$ and $a_3 = 19$

**5.** $a_1 = 5$ and $a_5 = 41$

**6.** $a_2 = 13$ and $a_4 = 21$

**7.** $a_3 = -9$ and $d = -6$

**8.** $a_{12} = 43$ and $d = 3$

**9.** $a_5 = 100$ and $d = 19$

**10.** $-37, -20, -3, 14, 31, \ldots$

**11.** $\dfrac{7}{2}, \dfrac{9}{2}, \dfrac{11}{2}, \dfrac{13}{2}, \dfrac{15}{2}, \ldots$

**12.** $15, 11, 7, 3, -1, \ldots$

**13.** $a_1 = 12$ and $a_3 = -7$

**14.** $a_{73} = 224$ and $a_{75} = 230$

**15.** $a_1 = -1$ and $a_6 = -11$

**16.** $a_5 = -\dfrac{5}{2}$ and $d = \dfrac{3}{2}$

**17.** $a_4 = 17$ and $d = -4$

**18.** $a_{34} = -71$ and $d = -2$

Determine if each of the following sequences is arithmetic. If so, find the common difference.

**19.** The sequence of even numbers

**20.** $1, 2, 4, 7, 11, 16, \ldots$

**21.** $1, 2, 3, 4, 5, 6, 7, \ldots$

**22.** The Fibonacci sequence

**23.** $1, 2, 4, 8, 16, 32, \ldots$

**24.** $42, 38, 34, 30, 26, 22, \ldots$

**25.** $0, 1, 0, 2, 0, 3, 0, 4, \ldots$

**26.** $12, 12, 12, 12, 12, \ldots$

Given the initial term and the common difference, find the value of the $7^{th}$ term of each of the arithmetic sequences.

**27.** $a_1 = 1$ and $d = 2$ **28.** $a_1 = 4$ and $d = -3$ **29.** $a_1 = 0$ and $d = \frac{1}{3}$

**30.** $a_1 = 3$ and $d = \pi$ **31.** $a_1 = 8$ and $d = -1$ **32.** $a_1 = \frac{1}{2}$ and $d = 3$

Given two terms, find the common difference and the first five terms of each of the arithmetic sequences.

**33.** $a_1 = 5$ and $a_2 = 7.5$

**34.** $a_6 = 27$ and $a_9 = 42$

**35.** $a_7 = 49$ and $a_{11} = 77$

**36.** $a_4 = 76$ and $a_8 = 156$

**37.** $a_5 = -26$ and $a_9 = 10$

**38.** $a_8 = 45$ and $a_{10} = 53$

Find the common difference of each of the following sequences. See Example 1.

**39.** $\{5n - 3\}$ **40.** $\left\{3n - \frac{1}{2}\right\}$ **41.** $\{n + 6\}$

**42.** $\{1 - 4n\}$ **43.** $\{\sqrt{2} - 2n\}$ **44.** $\{n\sqrt{3} + 5\}$

Use the given information about each arithmetic sequence to answer the question.

**45.** Given that $a_1 = -3$ and $a_5 = 5$, what is $a_{100}$?

**46.** In the sequence $24, 43, 62, \ldots$, which term is 955?

**47.** In the sequence $1, \frac{4}{3}, \frac{5}{3}, \ldots$, which term is 25?

**48.** Given that $a_5 = -\frac{5}{3}$ and $a_9 = 1$, what is $a_{62}$?

**49.** In the sequence $-16, -9, -2, \ldots$, what is $a_{20}$?

**50.** In the sequence $\frac{1}{4}, \frac{7}{16}, \frac{5}{8}, \ldots$, which term is $\frac{35}{8}$?

**51.** In the sequence $2, 5, 8, 11, \ldots$, what is the $9^{th}$ term?

**52.** In the sequence $1, 3, 5, 7, \ldots$, what is the $6^{th}$ term?

**53.** In the sequence $16, 12, 8, 4, \ldots$, what is the $7^{th}$ term?

**54.** In the sequence $\frac{1}{2}, 2, \frac{7}{2}, 5, \ldots$, what is the $8^{th}$ term?

**55.** In the sequence $-2, 1, 4, 7, \ldots$, what is the $6^{th}$ term?

**56.** In the sequence $9, 6, 3, 0, \ldots$, what is the $10^{th}$ term?

**57.** In the sequence $5, 10, 15, 20, \ldots$, what is the $11^{th}$ term?

**58.** In the sequence $2\sqrt{2}, 4\sqrt{2}, 6\sqrt{2}, 8\sqrt{2}, \ldots$, what is the $7^{th}$ term?

Find the value of the partial sum of each arithmetic sequence. See Example 4.

**59.** $\sum_{i=1}^{100}(3i-8)$

**60.** $\sum_{i=1}^{50}(-2i+5)$

**61.** $\sum_{i=5}^{90}(4i+9)$

**62.** $3+11+\cdots+795$

**63.** $25+18+\cdots+(-143)$

**64.** $-12+2+\cdots+674$

**65.** $\sum_{i=1}^{37}\left(-\frac{3}{5}i-6\right)$

**66.** $\sum_{i=100}^{200}(3i+57)$

**67.** $\sum_{i=2}^{42}(2i-22)$

**68.** $-90+(-77)+\cdots+92$

**69.** $7+3+\cdots+(-101)$

**70.** $4+\frac{81}{20}+\cdots+900$

## APPLICATIONS

**71.** Cynthia borrows \$21,000, interest-free, from her parents to help pay for her college education, and promises that upon graduation she will pay back the sum beginning with \$1000 the first year and increasing the amount by \$1000 with each successive year. How many years will it take for her to repay the entire \$21,000?

**72.** A certain theatre is shaped so that the first row has 30 seats, and, moving toward the back, each successive row has two seats more than the previous one. If there are 40 rows, how many seats does the last row contain? How many seats are there altogether?

**73.** A brick mason spends a morning moving a pile of bricks from his truck to the work site by wheelbarrow. Each brick weighs two pounds, and on his first trip he transports 100 pounds. On each successive trip, as he tires, he decides to move one less brick. How many pounds of bricks has he transported after 20 trips?

**74.** The manager of a grocery store decides to create a display of soup cans by placing cans in a row on the floor and then stacking successive rows so that each level of the tower has one less can than the one below it. The manager wants the top row to have 5 cans, and the store has 290 cans that can be used for the display. If all of the cans are used, how many rows will the display have?

**75.** A man decides to lease a car and is told that his payment to the car dealership will be \$50 in the first month. He is also told that every month thereafter, for the next 60 months, his payments will increase by \$25. How much is his monthly payment after two years? How much has he paid in total after the first two years?

**76.** Your grandmother doesn't trust banks, so she decided to save for your college education by periodically adding money to a mason jar buried in her flower garden. She began the practice with \$65 and added \$15 every time she got her monthly paycheck. If she continued this routine for 18 years, how much money did she manage to save for you?

## TECHNOLOGY

Use a graphing utility to evaluate each of the following sums.

**77.** $1.2+2.8+4.4+6.0+7.6+\cdots+28.4$

**78.** $5+\frac{5}{2}+0+\frac{-5}{2}+\cdots+\frac{-45}{2}$

**79.** $\sum_{i=1}^{25} 89.47-7.35i$

**80.** $\sum_{i=1}^{32} 4.12i+17.54$

**81.** $\sum_{i=49}^{83} (4.37i+8.21)$

**82.** $\sum_{i=23}^{79} \left(\frac{256i}{397}+\frac{57}{481}\right)$