Oral Exercises

Give the common difference and supply the missing terms for each arithmetic sequence.

1. 3, 7, 11, 15, ?, ?
2. 21, 15, 9, 3, ?, ?
3. 7, 10, ?, 16, 19, ?
4. ?, ?, 25, 50, 75, 100

Give the common ratio and supply the missing terms for each geometric sequence.

5. 3, 6, 12, 24, ?, ?
6. 1, −2, 4, −8, ?, ?
7. $\frac{1}{100}, \frac{1}{10}, ?, 10, 100, ?$
8. ?, ?, $\frac{1}{3}, \frac{1}{9}, \frac{1}{27}, \frac{1}{81}$

Tell the first four terms of the sequence with the given formula. Then tell whether the sequence is arithmetic, geometric, or neither.

9. $t_n = 1 - 2n$
10. $t_n = \frac{1}{n+1}$
11. $t_n = 3^n$
12. $t_n = n^2 - 1$

Give the next two terms of each sequence by using the pattern in the differences between terms.

13. 8, 9, 11, 14, ?, ?
14. 5, 7, 11, 17, ?, ?

Written Exercises

Tell whether each sequence is arithmetic, geometric, or neither. Then supply the missing terms of the sequence.

A

1. 20, 17, 14, 11, ?, ?
2. 5, 9, 13, 17, ?, ?
3. 1, 5, 25, 125, ?, ?
4. 256, 64, 16, 4, ?, ?
5. 18, 22, 26, ?, 34, ?
6. 4, ?, −4, −8, −12, ?
7. $1, \frac{1}{4}, \frac{1}{9}, \frac{1}{16}, ?, ?$
8. 32, −16, 8, −4, ?, ?
9. $4^{1/2}, 4^{3/2}, 4^{5/2}, 4^{7/2}, ?, ?$
10. $\frac{1}{12}, \frac{2}{13}, \frac{3}{14}, \frac{4}{15}, ?, ?$

Find the first four terms of the sequence with the given formula. Then tell whether the sequence is arithmetic, geometric, or neither.

11. $t_n = 4n + 3$
12. $t_n = 2n + 1$
13. $t_n = 3^{n-1}$
14. $t_n = 2 \cdot 3^n$
15. $t_n = \frac{(-2)^n}{8}$
16. $t_n = 13 - 4n$
17. $t_n = \log(n + 1)$
18. $t_n = \log 10^n$

19. a. What type of sequence is $-3, -1, 1, 3, \ldots$?

b. What type of sequence is $2^{-3}, 2^{-1}, 2^{1}, 2^{3}, \ldots$?

20. a. What type of sequence is $1, 4, 16, 64, \ldots$?

b. What type of sequence is $\log_2 1, \log_2 4, \log_2 16, \log_2 64, \ldots$?

Find the next two terms of each sequence by using the pattern in the differences between terms.

B **21.** $2, 4, 8, 14, 22, \ldots$

22. $-3, 1, 9, 21, 37, \ldots$

23. $60, 48, 38, 30, 24, \ldots$

24. $24, 23, 21, 17, 9, \ldots$

25. $1, 3, 7, 15, 31, \ldots$

26. $0, 1, 4, 13, 40, \ldots$

27. $1, 1, 2, 3, 5, 8, 13, \ldots$

28. $1, 2, 6, 15, 31, \ldots$

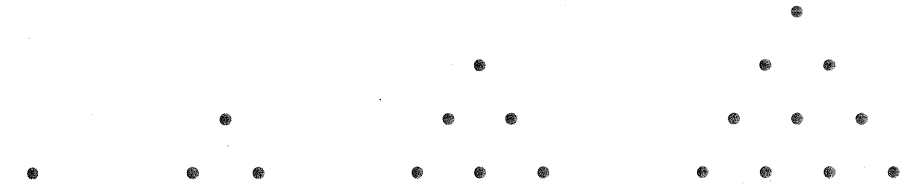
(The well-known sequence in Exercise 27 is called the *Fibonacci sequence*. Each term is the sum of the two terms before it.)

29. $1, 3, 6, 11, 19, 31, \ldots$

30. $5, 7, 10, 16, 27, 45, \ldots$

[*Hint:* For Exercises 29 and 30, look at the *second* differences (that is, the differences of the differences between terms).]

31. A *triangular number* can be represented by dots that are arranged in the shape of an equilateral triangle, as shown below. The first four triangular numbers are given.

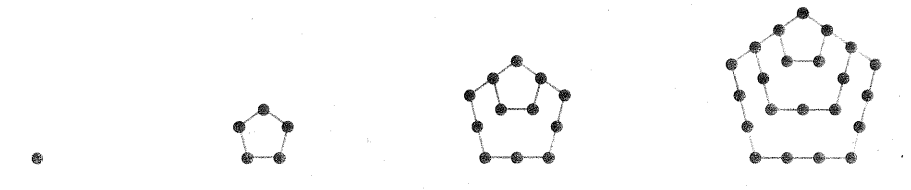


$t_1 = 1$ $t_2 = 3$ $t_3 = 6$ $t_4 = 10$

a. Find the next two triangular numbers.

b. Find the tenth triangular number without actually drawing a diagram.

32. A *pentagonal number* can be represented by dots that are arranged in the shape of a pentagon, as shown below. The first four pentagonal numbers are given.



$t_1 = 1$ $t_2 = 5$ $t_3 = 12$ $t_4 = 22$

a. Find the next two pentagonal numbers.

b. Find the tenth pentagonal number without drawing a diagram.