PRACTICE & PROBLEM SOLVING

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Practice Tutorial

Additional Exercises Available Online

UNDERSTAND

10. Make Sense and Persevere What can you tell about the terms of an arithmetic sequence when the common difference is negative?

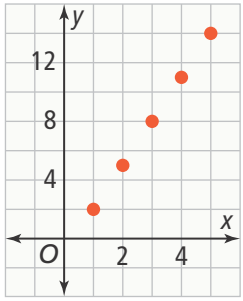
11. Mathematical Connections How does the domain of an arithmetic sequence compare to the domain of a linear function? Explain.

12. Error Analysis Describe and correct the error a student made in identifying the common difference of the following sequence: 29, 22, 15, 8, 1, ...

> The common difference of the sequence is 7, since 29 – 22 = 7, 22 – 15 = 7, 15 – 8 = 7, and 8 – 1 = 7. ✗

13. Reason Given the common difference and the first term of an arithmetic sequence, which formula – the recursive or explicit formula – would be more useful to determine a_{500}? Explain. Would your answer change if you knew the value of term a_{499}? Explain.

14. Reason The graph of an arithmetic sequence is shown. Write a recursive formula for the arithmetic sequence if the *y*-value of each point is increased by 3.



15. Use Structure Does an explicit formula for a sequence make sense assuming $n = 2.5$? Explain.

16. Higher Order Thinking Consider the following recursive formula which describes the Fibonacci sequence.

$a_1 = 1, a_2 = 1$

$a_{(n+1)} = a_n + a_{(n-1)}$

a. Find the first 6 terms of the sequence.

b. Is the Fibonacci sequence an arithmetic sequence? Explain.

PRACTICE

Tell whether or not each sequence is an arithmetic sequence. If it is, give the common difference, *d*. SEE EXAMPLE 1

17. 1, 15, 29, 43, 57, . . .

18. 77, 64, 51, 38, 25, . . .

19. 1, –2, 3, –4, 5, . . .

20. 3, 6, 9, 12, 15, . . .

21. 3, 6, 9, 15, 18, . . .

22. 37, 34, 31, 29, 26, . . .

23. 93, 86, 79, 72, 65, . . .

24. 45, 54, 63, 72, 81, . . .

Write a recursive formula and an explicit formula for each arithmetic sequence. SEE EXAMPLES 2 AND 3

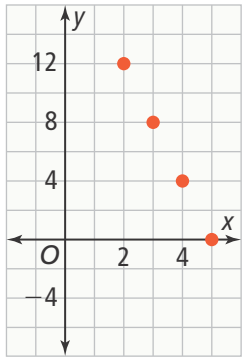
25. 12, 19, 26, 33, 40, . . .

26. –4, 5, 14, 23, 32, . . .

27. 62, 57, 52, 47, 42, . . .

28. –15, –6, 3, 12, 21, . . .

29.



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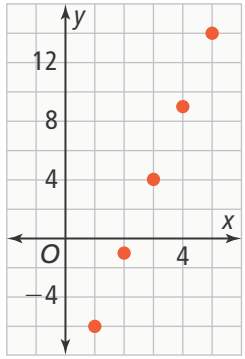

Write an explicit formula for each recursive formula. SEE EXAMPLE 4

31. $a_n = a_{n-1} + 15; a_1 = 8$

32. $a_n = a_{n-1} + 6; a_1 = 9$

33. $a_n = a_{n-1} - 2; a_1 = -1$

34. $a_n = a_{n-1} - 21; a_1 = 56$

35. $a_n = a_{n-1} + 1; a_1 = 12$

36. $a_n = a_{n-1} - 7; a_1 = -3$

Write a recursive formula for each explicit formula and find the first term of the sequence. SEE EXAMPLE 5

37. $a_n = 10 + 8n$

38. $a_n = 108 - n$

39. $a_n = -29 + 12n$

40. $a_n = 35 + 52n$

41. $a_n = \frac{7}{2} - 3n$

42. $a_n = 7 + \frac{1}{4}n$

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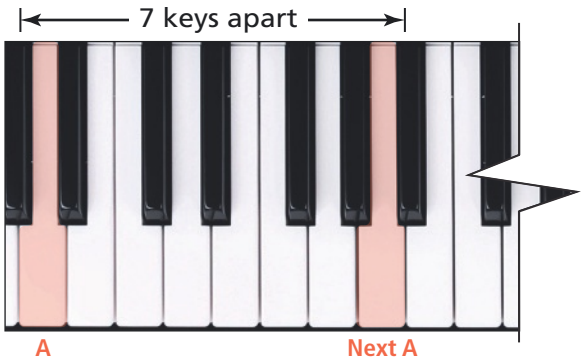
APPLY

43. **Make Sense and Persevere** The lowest and leftmost note on a piano keyboard is an A. The next lowest A is seven white keys to the right. This pattern continues. Write an explicit formula for an arithmetic sequence to represent the position of each A key on the piano, counting from the left. If a piano has 52 white keys, in what position is the key that plays the highest A?



44. **Make Sense and Persevere** After the first raffle drawing, 497 tickets remain. After the second raffle drawing, 494 tickets remain. Assuming that the pattern continues, write an explicit formula for an arithmetic sequence to represent the number of raffle tickets that remain after each drawing. How many tickets remain in the bag after the seventh raffle drawing?

45. **Reason** In a video game, you must score 5,500 points to complete level 1. To move through each additional level, you must score an additional 3,250 points. What number would you use as a_1 when writing an arithmetic sequence to represent this situation? What would n represent? Write an explicit formula to represent this situation. Write a recursive formula to represent this situation.

ASSESSMENT PRACTICE

46. Fill in the blanks to complete the recursive formula that corresponds to the sequence shown.

14, 23, 32, 41, 50, . . .

a___ = _____ + _____ n

47. **SAT/ACT** Which sequence is an arithmetic sequence?

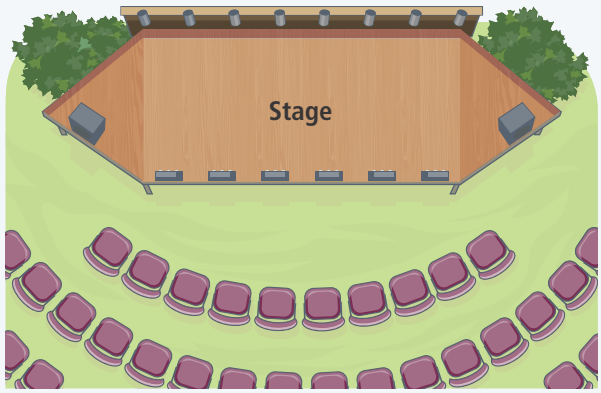
Ⓐ 1, 3, 5, 7, 11, . . .

Ⓑ 4, 6, 9, 13, 18, . . .

Ⓒ 8, 15, 22, 29, 36, . . .

Ⓓ 3, 6, 12, 24, 48, . . .

48. **Performance Task** A city sets up 14 rows of chairs for an outdoor concert. Each row has 2 more chairs than the row in front of it.



Part A Write a recursive formula to represent the number of chairs in the nth row.

Part B Write an explicit formula to represent the number of chairs in the nth row.

Part C Graph the sequence for the first 5 rows.

Part D What linear function represents the sequence? Which represents this situation best, this linear function or one of the formulas you wrote? Explain.