12.2 Analyze Arithmetic Sequences and Series

pp. 802–809

EXAMPLE

Write a rule for the *n*th term of the sequence 9, 13, 17, 21, 25, ...

The sequence is arithmetic with first term $a_1 = 9$ and common difference $d = 4$. So, a rule for the nth term is:

$a_n = a_1 + (n - 1)d$ — Write general rule.

$= 9 + (n - 1)(4)$ — Substitute 9 for a_1 and 4 for d.

$= 5 + 4n$ — Simplify.

EXERCISES

EXAMPLES 2, 3, 4, and 5 on pp. 803–805 for Exs. 9–16

Write a rule for the *n*th term of the arithmetic sequence.

9. 8, 5, 2, −1, −4, . . .

10. $d = 7, a_8 = 54$

11. $a_4 = 27, a_{11} = 69$

Find the sum of the series.

12. $\sum_{i=1}^{15} (3 + 2i)$

13. $\sum_{i=1}^{26} (25 - 3i)$

14. $\sum_{i=1}^{22} (6i - 5)$

15. $\sum_{i=1}^{30} (-84 + 8i)$

16. COMPUTER Joe buys a $600 computer on layaway by making a $200 down payment and then paying $25 per month. Write a rule for the total amount of money paid on the computer after n months.

12.3 Analyze Geometric Sequences and Series

pp. 810–817

EXAMPLE

Find the sum of the series $\sum_{i=1}^{7} 5(3)^{i-1}$.

The series is geometric with first term $a_1 = 5$ and common ratio $r = 3$.

$S_7 = a_1\left(\frac{1 - r^7}{1 - r}\right)$ — Write rule for S_7.

$= 5\left(\frac{1 - 3^7}{1 - 3}\right)$ — Substitute 5 for a_1 and 3 for r.

$= 5465$ — Simplify.

EXERCISES

EXAMPLES 2, 3, 4, and 5 on pp. 811–813 for Exs. 17–23

Write a rule for the *n*th term of the geometric sequence.

17. 256, 64, 16, 4, 1, . . .

18. $r = 5, a_2 = 200$

19. $a_1 = 144, a_3 = 16$

Find the sum of the series.

20. $\sum_{i=1}^{6} 3(5)^{i-1}$

21. $\sum_{i=1}^{9} 8(2)^{i-1}$

22. $\sum_{i=1}^{5} 15\left(\frac{2}{3}\right)^{i-1}$

23. $\sum_{i=1}^{7} 40\left(\frac{1}{2}\right)^{i-1}$