

Practice 5-6

Describing Number Patterns

Find the common difference of each arithmetic sequence.

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| 1. 10, 16, 22, 28, ... | 2. 9, 6, 3, 0, ... |
| 3. -12, -17, -22, -27, ... | 4. -11, -8, -5, -2, ... |
| 5. $4, 4\frac{1}{2}, 5, 5\frac{1}{2}, \dots$ | 6. $7\frac{1}{2}, 7, 6\frac{1}{2}, 6, \dots$ |
| 7. 9, 10.5, 12, 13.5, ... | 8. 1, -1.5, -4, -6.5, ... |
| 9. 8, 9.1, 10.2, 11.3, ... | 10. -9, -8.1, -7.2, -6.3, ... |
| 11. -3, -0.6, 1.8, 4.2, ... | 12. 6.2, 4.5, 2.8, 1.1, ... |

Find the next two terms in each sequence.

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| 13. 1, 7, 13, 19, ... | 14. -8, -5, -2, 1, ... |
| 15. 1, -4, -9, -14, ... | 16. $\frac{1}{2}, -\frac{1}{2}, -\frac{3}{2}, -\frac{5}{2}, \dots$ |
| 17. 2.7, 4, 5.3, 6.6, ... | 18. 9.8, 0.7, -8.4, -17.5, ... |
| 19. $6\frac{1}{3}, 4\frac{2}{3}, 3, 1\frac{1}{3}, \dots$ | 20. $2\frac{1}{2}, \frac{3}{4}, -1, -2\frac{3}{4}, \dots$ |

Find the fifth, tenth, and hundredth terms of each sequence.

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| 21. 4, 14, 24, 34, ... | 22. 14, 6, -2, -10, ... |
| 23. 3, 10, 17, 24, ... | 24. -19, -22, -25, -28, ... |
| 25. $\frac{1}{4}, -\frac{1}{4}, -\frac{3}{4}, -\frac{5}{4}, \dots$ | 26. -1.3, -0.3, 0.7, 1.7, ... |
| 27. 0, 101, 202, 303, ... | 28. -1, -100, -199, -298, ... |
| 29. 5, 3.9, 2.8, 1.7, ... | 30. $-3\frac{1}{2}, -3\frac{3}{4}, -4, -4\frac{1}{4}, \dots$ |

Determine whether each sequence is arithmetic. Justify your answer.

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| 31. 0.5, 0.3, 0.1, -0.1, ... | 32. -1, 1, -1, 1, ... |
| 33. 3, 6, 12, 24, ... | 34. 100, 81, 64, 49, ... |
35. Renting a backhoe costs a flat fee of \$65 plus an additional \$35 per hour.
- Write the first four terms of a sequence that represents the total cost of renting the backhoe for 1, 2, 3, and 4 hours.
 - What is the common difference?
 - What are the 5th, 24th, 48th, and 72nd terms in the sequence?

Practice 8-6

Geometric Sequences

Find the next three terms of each sequence.

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| 1. 4, 12, 36, 108, ... | 2. 2, -8, 32, -128, ... |
| 3. 18, 9, $\frac{9}{2}$, $\frac{9}{4}$, ... | 4. 1, $-\frac{1}{3}$, $\frac{1}{9}$, $-\frac{1}{27}$, ... |
| 5. -2, 20, -200, 2000, ... | 6. 30, -10, $\frac{10}{3}$, $-\frac{10}{9}$, ... |
| 7. $\frac{1}{3}$, $1\frac{1}{3}$, $5\frac{1}{3}$, $21\frac{1}{3}$, ... | 8. 20, 4, $\frac{4}{5}$, $\frac{4}{25}$, ... |
| 9. -100, -40, -16, -6.4, ... | 10. 40, 20, 10, 5, ... |

Determine whether each sequence is arithmetic or geometric.

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| 11. -8, -10, -12.5, -15.625, ... | 12. 5, 1, -3, -7, ... |
| 13. 1, $\frac{2}{5}$, $\frac{4}{25}$, $\frac{8}{125}$, ... | 14. -0.2, -0.02, -0.002, -0.0002, ... |
| 15. -10, -5, 0, 5, ... | 16. 6, -3, $\frac{3}{2}$, $-\frac{3}{4}$, ... |

Write a rule for each sequence.

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| 17. 4, 12, 36, 108, ... | 18. 2, -8, 32, -128, ... |
| 19. 18, 9, $\frac{9}{2}$, $\frac{9}{4}$, ... | 20. 1, $-\frac{1}{3}$, $\frac{1}{9}$, $-\frac{1}{27}$, ... |
| 21. -2, 20, -200, 2000, ... | 22. 30, -10, $\frac{10}{3}$, $-\frac{10}{9}$, ... |
| 23. 1, 4, 16, 64, ... | 24. 6, 12, 24, 48, ... |
| 25. 125, 25, 5, 1, ... | 26. 50, 25, 12.5, 6.25, ... |

Find the first, fourth, and eighth terms of each sequence.

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| 27. $A(n) = 2 \cdot 3^{n-1}$ | 28. $A(n) = 3 \cdot 4^{n-1}$ | 29. $A(n) = 3 \cdot 2^{n-1}$ |
| 30. $A(n) = -1 \cdot 5^{n-1}$ | 31. $A(n) = 4 \cdot 2^{n-1}$ | 32. $A(n) = \frac{1}{2} \cdot 2^{n-1}$ |
| 33. $A(n) = 0.1 \cdot 4^{n-1}$ | 34. $A(n) = -2.1 \cdot 3^{n-1}$ | 35. $A(n) = 10 \cdot 5^{n-1}$ |

Write a rule and find the given term in each geometric sequence described below.

- What is the sixth term when the first term is 4 and the common ratio is 3?
- What is the fifth term when the first term is -2 and the common ratio is $-\frac{1}{2}$?
- What is the tenth term when the first term is 3 and the common ratio is -1.2?
- What is the fourth term when the first term is 5 and the common ratio is 6?
- Suppose a manufacturer invented a computer chip in 1978 that had a computational speed of s . The company improves its chips so that every 3 years, the chip doubles in speed. What would the chip's speed have been for the year 2002? Write your solution in terms of s .