1.2 HW: Arithmetic Series

Determine whether each sequence is arithmetic, geometric, or neither. If it is arithmetic, identify the common difference. If it is geometric, find the common ratio.

1. 6, 10, 14, 18, 22, . . .

2. $-16, -13, -9, -4, 2, \ldots$

3. 500, 50, 5, 0.5, . . .

4. Write a geometric sequence with a common ratio of ¼. Explain how you developed the sequence.

Find the 24th term of each arithmetic sequence.

5. 2, 5, 8, 11, 14, . . .

6. 9, 5, 1, -3, -7, . . .

Find the missing terms in the following arithmetic sequences.

7. 65, ____, ____, 32, . . .

8. . . . 4, ___, 18, . . .

9. There is a puddle 1.4 cm deep in your backyard. After one minute of rain, the puddle was 1.45 cm deep. The puddle was 1.5 cm deep after it rained for two minutes. If the pattern continues, how deep will the puddle be after it rains for 45 minutes?

Find the missing terms of each geometric sequence.

10. 1, _____, _____, 8, . . .

11. 108, _____, _____, 4, . . .

12. A corporation earned a profit of $420,000 in its first year of operation. Over the next 10 years, the company's CEO hopes to increase the profit by 8% each year. If the CEO reaches her goal, what will be the company's profit in its seventh year, to the nearest dollar?

Identify each list as a *series* or a *sequence* and *finite* or *infinite.*

13. 2, 6, 10, 14, …

14. 1 + 4 + 7 + 10 + 13

15. 4, 10, 16, 22, 28

Find the sum of each arithmetic series.

16. 1 + 3 + 5 + … + 99

17. 3 + 7 + 11 + 15 + … + 55

18. 106 + 101 + 96 + …. +1

19. 2 + 10 + 18 + … + 378

Write the following arithmetic series in summation notation.

20. 5 + 7 + 9 + … + 131

21. 3 + 7 + 11 + 15 + … + 55

1-3 HW Geometric Series

Find the sum of each finite geometric series.

1. 2 + 6 + 18 + … + 4374 *where n = 8.*

2. -4 - 8 -16 -… -2048 *where n = 10.*

3. 1 + 2 + 4 + … + 2048 *where n = 12.*

4. 3 + 9 + 27 + … + 6561 *where n = 8.*

Determine whether each infinite geometric series *diverges* or *converges*. Find the sum if the series converges.

5. $\mathbf{1 + \frac{1}{4} + \frac{1}{16} + \cdots}$

6. $\mathbf{2 + 8 + 32 + \cdots}$

7. $\mathbf{\frac{1}{4} + \frac{3}{8} + \frac{9}{16} + \cdots}$

8. $\mathbf{\frac{1}{2} + \frac{1}{16} + \frac{1}{128} + \cdots}$

9. Your classmate is trying to cut down on the amount of time he spends watching television. In January, he spent a total of 3600 minutes watching TV. He watched TV for 3240 minutes in February and 2916 minutes in March. If this pattern continues, how many minutes of TV will he watch the entire year?

10. Your brother is preparing for basketball season. He shot 26 baskets on the first day that he practiced. He shot 32 baskets on the second day and 38 baskets on the day after that.

a) If this pattern continues, how many baskets will he shoot on the 30th day?

b) How many baskets will he have shot during those 30 days?

11. A family farm produced 2400 ears of corn in its first year. For each of the next 9 years, the farm increased its yearly corn production by 15%. How many ears of corn did the farm produce during this 10-year period?

Name _____ Class _____ Date _____

Practice 1.4

Form K

The Binomial Theorem

Expand each binomial.

1. $(x + 4)^3$

2. $(5 + a)^6$

3. $(y + 1)^4$

4. $(3a + 2)^4$

5. $(x - 3)^5$

6. $(b + 1)^8$

7. $(x + 2)^3$

Find the specified term of each binomial expansion.

8. second term of $(x - 4)^8$

9. third term of $(x + 3)^{12}$

10. fourth term of $(x - 2)^7$

11. third term of $(x^2 - 2y)^6$

12. fifth term of $(3x - 1)^5$

13. seventh term of $(x - 4y)^6$

14. third term of $(x^2 + y^2)^8$

15. second term of $(2 + x)^4$

16. The term $56a^5b^3$ appears in the expansion of $(a + b)^n$. What is n?

17. The coefficient of the second term in the expansion of $(c + d)^n$ is 6. Find the value of n, and write the complete term.

State the number of terms in each expansion and give the first two terms.

18. $(2a + b)^7$

19. $(c - d)^8$

20. $(x + y)^3$

21. $(3x - y)^5$

22. $(x + y^2)^5$

23. $(4 - 2x)^7$

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Practice (continued) *Form K*

The Binomial Theorem

24. The side of a number cube is $x + 6$ units long. Write a binomial for the volume of the number cube. Use the Binomial Theorem to expand and rewrite the expression in standard form.

Expand each binomial.

25. $(m + 1)^4$

26. $(2y + 8)^3$

27. $(2x + 2)^3$

28. $(x - 1)^8$

29. $(x + 4)^5$

30. $(3b + 1)^6$

31. Open-Ended Write a binomial in the form of $(a + b)^n$ that will have a first term coefficient equal to 7.

32. Use Pascal's Triangle to determine the binomial of the expanded expression $x^8 + 8x^7 + 28x^6 + 56x^5 + 70x^4 + 56x^3 + 28x^2 + 8x + 1$.

33. Error Analysis Your friend expands the binomial $(x - 4)^5$ as $x^5 + 20x^4 + 160x^3 + 640x^2 + 1280x + 1024$. What mistake did your friend make? What is the correct expansion?

34. Reasoning Without writing any of the previous terms, how do you know that 64 is the seventh term of the expansion of the binomial $(x + 2)^6$.

35. In the expansion of $(2m - n)^7$, one of the terms contains n^2.
a. What is the exponent of $2m$ in this term?
b. What is the coefficient of this term?