

Name _____ Class _____ Date Alg 2

Lesson 9-1

Write a recursive definition for each sequence.

1. 3, 5, 7, ...

2. 19, 15, 11, ...

Decide whether each formula is *explicit* or *recursive*. Then find the first five terms of each sequence.

3. $a_n = 3n + 2$

4. $a_1 = 4; a_n = a_{n-1} + 7$

5. $a_n = 5n(n + 2)$

6. $a_1 = 2; a_n = a_{n-1} - 3$

Lesson 9-2

Determine whether each sequence is arithmetic. If so, identify the common difference.

7. 5, 9, 13, 17, ...

8. 7, 1, -5, -11, ...

9. 9, -18, 27, -36, ...

Find the 24th term of each sequence.

10. 9, 12, 15, 18, ...

11. 19, 12, 5, -2, ...

12. -187, -181, -175, -169, ...

Find the arithmetic mean a_n of the given terms.

13. $a_{n-1} = 10, a_{n+1} = 20$

14. $a_{n-1} = 7, a_{n+1} = 19$

15. $a_{n-1} = -2, a_{n+1} = -7$

Lesson 9-3

Find the eighth term of each geometric sequence.

16. 2, 6, 18, ...

17. -7, 21, -63, ...

18. $\frac{1}{12}, \frac{1}{2}, 3, \dots$

Write an explicit formula for each geometric sequence. Then generate the first five terms.

19. $a_1 = 6, r = 2$

20. $a_1 = -27, r = \frac{1}{3}$

21. $a_1 = 1900, r = 0.1$

Lesson 9-4

Find the sum of each finite arithmetic series.

22. $3 + 5 + 7 + 9 + 11$

23. $4 + 11 + 18 + \dots + 53$

24. $(-2) + 3 + 8 + \dots + 23$

Write each arithmetic series in summation notation. Then evaluate each series.

25. $21, 19, 17, 15, \dots$; 8 terms

26. $4, 7, 10, 13, 16, 19, \dots$; 10 terms

Find the sum of each finite series.

27. $\sum_{n=1}^5 (2n + 3)$

28. $\sum_{n=2}^7 (4 - n)$

29. $\sum_{n=1}^5 (n + 1)$

Lesson 9-5

Evaluate the sum of the finite geometric series.

30. $1 + 2 + 4 + \dots$; $n = 8$

31. $3 + 6 + 12 + \dots$; $n = 7$

32. $243 - 81 + 27 - 3 + \dots$; $n = 8$

33. $\frac{1}{27} + \frac{1}{3} + 3 + \dots$; $n = 7$

Determine whether each infinite geometric series *diverges* or *converges*.

If it converges, state the sum.

34. $4 + 2 + 1 + \frac{1}{2} + \dots$

35. $3 - 1 + \frac{1}{3} - \frac{1}{9} + \dots$

36. $2.2 - 0.22 + 0.022 - \dots$

Determine whether each series is *arithmetic* or *geometric*. Then evaluate the finite series for the specified number of terms.

37. $3 + 6 + 9 + 12 + 15 + \dots$; 10th term

38. $3 + 6 + 12 + 24 + 48 + \dots$; 10th term

39. $-1000 + 500 - 250 + 125 - \dots$; 7th term

40. $87 + 72 + 57 + 42 + \dots$; 20th term

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Lesson 11-1

Evaluate each expression.

1. ${}_8P_5$

2. ${}_4C$

3. ${}_6C$

4. ${}_6P_2$

5. ${}_7C_3$

For each situation, determine whether to use a permutation or a combination.
Then solve the problem.

6. How many different orders can you choose to read six of the nine books on your summer reading list?
7. How many ways are there to choose five shirts out of seven to take to camp?
8. How many ways can you choose two out of four kinds of flowers for a bouquet?
9. You must answer exactly 12 out of 15 questions on a test. How many different ways can you select the questions to answer?
10. A lab assigns a three-digit identification to each subject in an experiment. No two subjects have the same identification. No digit can be repeated in an identification. What is the greatest number of subjects that can be used in the experiment?
11. To mark its eighth anniversary, Pizzeria Otto has a special coupon that offers the same price on a pizza with any combination of the 8 original toppings. Each pizza must have at least one topping. How many different kinds of pizza can be ordered with the coupon?

Lesson 11-2

12. A class rolled a number cube 40 times and recorded an even number 23 times.
What is the experimental probability of rolling an even number? odd number?

A card is chosen from a standard 52-card deck. Find each theoretical probability.

13. $P(\text{club})$ 14. $P(4 \text{ of hearts})$ 15. $P(\text{ace})$

Lesson 11-3

Classify each pair of events as *dependent* or *independent*.

16. A number cube is rolled; the number cube is rolled again.
17. A marble is chosen out of a bag; another remaining marble is chosen out of the bag.

Q and R are independent events. Find $P(Q \text{ and } R)$.

18. $P(Q) = \frac{1}{4}, P(R) = \frac{1}{8}$ 19. $P(Q) = \frac{2}{7}, P(R) = \frac{7}{9}$ 20. $P(Q) = 0.4, P(R) = 0.15$

Two fair number cubes are tossed. State whether the events are mutually exclusive. Explain your reasoning.

21. The sum is 10; the numbers are equal.
22. The sum is greater than 9; one of the numbers is 2.

S and T are mutually exclusive events. Find $P(S \text{ or } T)$.

23. $P(S) = \frac{1}{6}, P(T) = \frac{2}{3}$

24. $P(S) = \frac{7}{15}, P(T) = \frac{1}{5}$

25. $P(S) = 18\%, P(T) = 44\%$

A fair number cube is tossed. Find each probability.

26. $P(6 \text{ or even})$

27. $P(\text{even or more than } 1)$

28. $P(\text{even or prime})$

Lesson 11-4

Use the table to find each probability.

29. $P(\text{counselor a junior})$

30. $P(\text{counselor female})$

31. $P(\text{counselor a senior and male})$

32. $P(\text{counselor a junior} \mid \text{counselor female})$

33. $P(\text{counselor male} \mid \text{counselor a senior})$

34. The probability that Luis wins the election for class president is $\frac{3}{5}$. The probability that Mac wins the election for class treasurer is $\frac{2}{3}$.

The probability that both will win the office they are running for is $\frac{1}{2}$. What is the probability that Luis wins given that Mac wins?

Characteristics of Comp Counselors

Grade Level	Male	Female
Junior	18	21
Senior	25	16

35. You toss two number cubes. The sum of the numbers is greater than 5. What is the probability that you tossed the same number on each cube?

Lesson 11-5

Find the mean, median, and mode of each set of values.

36. 3 2 6 4 5 3 4 2 7 5 3

37. All the scores on an Advanced Algebra final exam are shown below.

59 62 63 63 72 74 74 78 79 81
83 84 84 84 89 90 92 94 96 98

- a. Find the mean, median, and mode for the data.
- b. What percentile is the student who scored 89?
- c. Draw a box-and-whisker plot for the data.
- d. Identify any outliers in the data. Explain your choice.

Lesson 11-6

Find the mean, variance, and standard deviation for each data set.

38. 6 8 5 2 7 3 5 6 7

39. 25 29 21 19 30 26 28

Lesson 11-7

- 40.** The school principal wants to find out how many students support starting a lacrosse team. The principal interviews students at random as they watch a soccer game. What sampling method was used? Identify any bias in the method.
- 41.** The mayor of your town is running for re-election. What sampling method could you use to find the percent of registered voters in your town who plan to re-elect the mayor? What is an example of a survey question that is likely to yield unbiased information?

Lesson 11-8

Find the probability of x successes in n trials for the given probability of success p on each trial.

42. $x = 2, n = 6, p = 0.7$

43. $x = 9, n = 10, p = 0.3$

Lesson 11-9

Sketch a normal curve for each distribution. Label the x -axis values at one, two, and three standard deviations from the mean.

44. mean = 30, standard deviation = 4

45. mean = 45, standard deviation = 11

46. The mean score on a quiz is 82 out of 100 possible points and the standard deviation is 4. Estimate the percent of scores that were 90 or higher.

Extra Practice**Chapter 12****Lesson 12-1**

Find each sum or difference.

$$1. \begin{bmatrix} -8 & 3 \\ 19 & -45 \end{bmatrix} + \begin{bmatrix} 12 & 64 \\ -7 & 63 \end{bmatrix}$$

$$2. \begin{bmatrix} 3.6 & -9.8 \\ 4.0 & -1.7 \end{bmatrix} - \begin{bmatrix} 0.8 & 3.4 \\ -6.1 & 7.9 \end{bmatrix}$$

Solve each matrix equation.

$$3. \begin{bmatrix} 25 & -60 \\ 42 & 91 \end{bmatrix} + X = \begin{bmatrix} -37 & 61 \\ 85 & 37 \end{bmatrix}$$

$$4. \begin{bmatrix} -8 & 3 & 1 \\ -9 & 6 & 7 \end{bmatrix} - X = \begin{bmatrix} 5 & 8 & 3 \\ 4 & 2 & 6 \end{bmatrix}$$

Lesson 12-2

Solve each matrix equation. Check your answers.

$$5. 2 \begin{bmatrix} 2 & -7 \\ 8 & -4 \end{bmatrix} + 4X = \begin{bmatrix} 0 & -6 \\ 4 & -8 \end{bmatrix}$$

$$6. 0.5X + \begin{bmatrix} -5 & 3 \\ 0 & -2 \end{bmatrix} = \begin{bmatrix} -3 & 3.5 \\ -1 & -0.5 \end{bmatrix}$$

For exercises 13-24, use matrices A , B , C , and D shown below. Perform the indicated operations if they are defined. If an operation is not defined, label it *undefined*.

$$A = \begin{bmatrix} 8 & 1 \\ -2 & 5 \end{bmatrix}$$

$$B = \begin{bmatrix} -3 & 1 & 0 \\ -2 & -1 & 5 \end{bmatrix}$$

$$C = \begin{bmatrix} 9 & 4 \\ 5 & 1 \\ 2 & 0 \end{bmatrix}$$

$$D = \begin{bmatrix} 1 & 7 & 3 \\ 8 & 10 & -2 \end{bmatrix}$$

7. AB

8. BD

9. $2A$

10. CD

11. DA

12. $-3B$

13. $0.2A$

14. BA

15. A frozen yogurt supplier uses two machines to make chocolate and vanilla frozen yogurt. Both machines can be used in the morning and afternoon. Matrix A show the maximum hourly output of each machine. Matrix B shows how long the machines are used for production of each flavor.

Matrix A : **Output (gal/h)**

Matrix B : **Time (h)**

	Chocolate	Vanilla
Machine 1	4	5
Machine 2	7	8

	A.M.	P.M.
Chocolate	2	3
Vanilla	1	2

- Compute the product AB of these matrices.
- Describe what this product represents.

Lesson 12-3

Determine whether the matrices are multiplicative inverses.

16. $\begin{bmatrix} \frac{1}{3} & \frac{2}{3} \\ 1 & \frac{4}{3} \end{bmatrix}, \begin{bmatrix} -6 & 3 \\ \frac{9}{2} & -\frac{4}{3} \end{bmatrix}$

17. $\begin{bmatrix} 2 & 4 \\ 1 & 2 \end{bmatrix}, \begin{bmatrix} \frac{1}{2} & \frac{1}{4} \\ 1 & \frac{1}{2} \end{bmatrix}$

Evaluate the determinant of each matrix.

18. $\begin{bmatrix} 2 & 4 \\ 2 & -3 \end{bmatrix}$

19. $\begin{bmatrix} 5 & -2 \\ -1 & 3 \end{bmatrix}$

20. $\begin{bmatrix} -2 & -7 \\ 0 & 4 \end{bmatrix}$

Determine whether each matrix has an inverse.

21. $\begin{bmatrix} 3 & 1 \\ -6 & -2 \end{bmatrix}$

22. $\begin{bmatrix} 2 & -1 \\ 4 & 2 \end{bmatrix}$

23. $\begin{bmatrix} 6 & 9 \\ 2 & 3 \end{bmatrix}$

Lesson 12-4

Solve each matrix equation. If an equation cannot be solved, explain why.

24. $\begin{bmatrix} 2 & 1 \\ -1 & 7 \end{bmatrix} X = \begin{bmatrix} 8 & 1 \\ -12 & 41 \end{bmatrix}$

25. $\begin{bmatrix} -1 & 0 \\ 6 & 3 \end{bmatrix} X = \begin{bmatrix} -9 \\ -3 \end{bmatrix}$