**LESSON 4.1 Skill Practice**

**Is There a Pattern Here?**

**Recognizing Patterns and Sequences**

**Vocabulary**

Choose the term that best completes each statement.

Sequence term of a sequence infinite sequence finite sequence

1. A sequence which terminates is called a(n)\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. A(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_is an individual number, figure, or letter in a sequence.

3. A(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_is a pattern involving an ordered arrangement of numbers, geometric

figures, letters, or other objects.

4. A sequence which continues forever is called a(n)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .

**Problem Set**

Describe each given pattern. Draw the next two figures in each pattern.

1.

.



The second figure has 2 more squares than the first, the third figure has 3 more squares than the

second, and the fourth figure has 4 more squares than the third.

2.

3.

4.

5.

6.

6.

Write a numeric sequence to represent each given pattern or situation.

7. The school cafeteria begins the day with a supply of 1000 chicken nuggets. Each student that passes

through the lunch line is given 5 chicken nuggets. Write a numeric sequence to represent the total

number of chicken nuggets remaining in the cafeteria’s supply after each of the first 6 students pass

through the line. Include the number of chicken nuggets the cafeteria started with.

1000, 995, 990, 985, 980, 975, 970

8. Write a numeric sequence to represent the number of squares in each of the first 7 figures

of the pattern.

9. Sophia starts a job at a restaurant. She deposits $40 from each paycheck into her savings account.

There was no money in the account prior to her first deposit. Write a numeric sequence to represent

the amount of money in the savings account after Sophia receives each of her first 6 paychecks.

10. Write a numeric sequence to represent the number of blocks in each of the first 5 figures

of the pattern.

11. Kyle is collecting canned goods for a food drive. On the first day he collects 1 can. On the second

day he collects 2 cans. On the third day he collects 4 cans. On each successive day, he collects

twice as many cans as he collected the previous day. Write a numeric sequence to represent the

total number of cans Kyle has collected by the end of each of the first 7 days of the food drive.

12. Write a numeric sequence to represent the number of line segments in each of the first 7 figures

of the pattern.

13. For her 10th birthday, Tameka’s grandparents give her a set of 200 stamps. For each birthday after

that, they give her a set of 25 stamps to add to her stamp collection. Write a numeric sequence

consisting of 7 terms to represent the number of stamps in Tameka’s collection after each of her

birthdays starting with her 10th birthday.

14. Write a numeric sequence to represent the number of squares in each of the first 6 figures

of the pattern.

6.

15. Leonardo uses 3 cups of flour in each cake he bakes. He starts the day with 50 cups of flour.

Write a numeric sequence to represent the amount of flour remaining after each of the first 7 cakes

Leonardo bakes. Include the amount of flour Leonardo started with.

16. Write a numeric sequence to represent the number of triangles in each of the first 7 figures

of the pattern.

**LESSON 4.2 Skill Practice**

**The Password Is . . . Operations!**

**Arithmetic and Geometric Sequences**

**Vocabulary**

Describe each given sequence using the terms arithmetic sequence, common difference, geometric

sequence, and common ratio as they apply.

1. 10, 20, 30, 40, . . .
2. 1, 2, 4, 8, . . .

**Problem Set**

Determine the common difference for each arithmetic sequence.

1. 1, 5, 9, 13, . . . 2. 10, 3, 24, 211, . . .

*d =* **5** -1

*d* **=** 4

3. 10.5, 13, 15.5, 18,… 4. 

5. 95, 91.5, 88, 84.5, . . . 6. 170, 240, 310, 380, . . .

7. 1250, 1190, 1130, 1070, . . . 8. -4.8, -6.0, -7.2, -8.4, . . .

9.  10. -28, -13, 2, 17, . . .

Determine the common ratio for each geometric sequence.

11. 5, 10, 20, 40, . . . 12. 2, 8, 32, 128, . . .

*r* **=** 10 5

*r* **=** 2

13. 3, -6, 12, -24, . . . 14. 800, 400, 200, 100, . . .

15. 10, -30, 90, -270, . . . 16. 64, -32, 16, -8, . . .

17. 5, 40, 320, 2560, . . . 18. 45, 15, 5, 

19. 0.2, -1, 5, -25, . . . 20. 150, 30, 6, 1.2, . . .

Determine the next 3 terms in each arithmetic sequence.

21. 8, 14, 20, 26, 32 , 38 , 44 , . . .

22. 90, 75, 60, 45,…

23. -24, -14, -4, 6,..

24. 

25. 20, 11, 2, 27,…

26. 12, 16.5, 21, 25.5, . . .

27. -101, -112, -123, -134,. . .

28. 3.8, 5.1, 6.4, 7.7, . . .

29. -500, -125, 250, 625, . . .

30. 24.5, 20.7, 16.9, 13.1, . . .

Determine the next 3 terms in each geometric sequence.

31. 3, 9, 27, 81, 243 , 729 , 2187 , . . .

32. 512, 256, 128, 64, . . .

33. 5, -10, 20, -40,, . . .

34. 3000, 300, 30, 3, . .

35. 2, -2, 2, -2, . . .

36. 0.2, 1.2, 7.2, 43.2,. . .

37. -8000, 4000, -2000, 1000, …

38. 0.1, 0.4, 1.6, 6.4,…

39. 156.25, 31.25, 6.25, 1.25, …

40. 7, -21, 63, -189, …

Determine whether each given sequence is arithmetic, geometric, or neither. For arithmetic and geometric

sequences, write the next 3 terms of the sequence.

41. 4, 8, 12, 16, . . .

The sequence is arithmetic. The next 3 terms are 20, 24, and 28.

42. 2, 4, 7, 11, . . .

43. 3, 12, 48, 192, . . .

44. 9, -18, 36, -72, . . .

45. 1.1, 1.11, 1.111, 1.1111, . . .

46. 4, -8, -20, -32, . . .

47. 7.5, 11.6, 15.7, 19.8, . . .

48. 1, -4, 9, -16, . . .

49. 5, -20, 80, -320, . . .

50. 9.8, 5.6, 1.4, -2.8, . . .

**LESSON 4.3 Skill Practice**

**The Power of Algebra Is a Curious Thing**

**Using Formulas to Determine Terms of a Sequence**

**Vocabulary**

Choose the term that best completes each statement.

 Index explicit formula recursive formula

1. A(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ expresses each term of a sequence based on the preceding term

of the sequence.

2.The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the position of a term in a sequence.

3. A(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ calculates each term of a sequence using the term’s position

in the sequence.

**Problem Set**

Determine each unknown term in the given arithmetic sequence using the explicit formula.

1. Determine the 20th term of the sequence 2. Determine the 30th term of the sequence

 1, 4, 7, . . . -10, -15, -20, . . .

*an* **=** *a*1 **+** *d*(*n* **-** 1)

*a*20 **=** 1 **+** 3(20 **-** 1)

*a*20 **=** 1 **+** 3(19)

*a*20 **=** 1 **+** 57

*a*20 **=** 58

3. Determine the 25th term of the sequence 4. Determine the 50th term of the sequence

100, 92, 84, . . . 3.3, 4.4, 5.5, . . .

5. Determine the 42nd term of the sequence 6. Determine the 28th term of the sequence

–242, –251, –260, . . . 12.25, 14.50, 16.75, . .

7. Determine the 34th term of the sequence 8. Determine the 60th term of the sequence

 -76.2, -70.9, -65.6, . . . 10, 25, 40, . . .

9. Determine the 57th term of the sequence 10. Determine the 75th term of the sequence

 672, 660, 648, . . . -200, -100, 0, . . .

Determine each unknown term in the given geometric sequence using the explicit formula. Round the

answer to the nearest hundredth when necessary.

11. Determine the 10th term of the sequence 12. Determine the 15th term of the sequence

3, 6, 12, . . . 1, -2, 4, . . .

*gn* **=** *g*1  *r n***2**1

*g*10 **=** 3 2 10**2**1

*g*10 **=** 3 2 9

*g*10 **=** 3 512

*g*10 **=** 1536

13. Determine the 12th term of the sequence 14. Determine the 16th term of the sequence

5, 15, 45, . . . 9, 18, 36, . . .

15. Determine the 20th term of the sequence 16. Determine the 18th term of the sequence

0.125, -0.250, 0.500, . . . 3, 9, 27, . . .

17. Determine the 14th term of the sequence 18. Determine the 10th term of the sequence

-4, 8, -16, . . . 0.1, 0.5, 2.5, . . .

19. Determine the 12th term of the sequence 20. Determine the 10th term of the sequence

4, 5, 6.25, . . . 5, -25, 125, . . .

Determine whether each sequence is arithmetic or geometric. Then, use the appropriate recursive formula to determine the unknown term(s) in the sequence.

21. 4, 8, 16, 32, 64 , . . .

The sequence is geometric.



22. 16, 30, 44, 58,\_\_\_\_\_\_\_\_\_\_\_\_\_\_,…

23. 2, -6, 18,\_\_\_\_\_\_\_\_\_ , 162,\_\_\_\_\_\_\_\_ ,…..

24. 7.3, 9.4, 11.5, , 15.7,\_\_\_\_\_\_\_ , . . .

25. 320, 410, 500,\_\_\_\_\_\_\_\_\_\_,\_\_\_\_\_\_\_\_,…

26. 7, 21, 63,\_\_\_\_\_\_\_\_ , 567,\_\_\_\_\_\_\_\_\_ , . . .

27. -68, -83, -98,\_\_\_\_\_ ,\_\_\_\_\_\_\_\_\_ ,\_\_\_\_\_\_\_\_\_\_ , . . .

28. -5, 20, -80,\_\_\_\_\_\_ ,\_\_\_\_\_\_\_\_ ,\_\_\_\_\_\_\_\_\_ , . . .

Determine the unknown term in each arithmetic sequence using a graphing calculator.

29. Determine the 20th term of the sequence 30. Determine the 25th term of the sequence

 30, 70, 110, . . . -25, -50, -75, . . .

31. Determine the 30th term of the sequence

 16, 24, 32, . . .

32. Determine the 35th term of the sequence

 120, 104, 88, . . .