1. A sequence is defined by the equations \( a_1 = 6 \) and \( a_n = 2a_{n-1} \). What is the fifth term in the sequence?

A. 30  
B. 48  
C. 60  
D. 96

2. An arithmetic sequence is defined by the equations \( a_1 = 10 \) and \( a_n = a_{n-1} + 6 \). What is the third term of \( a_n = a_{n-1} + 6 \)?

A. 19  
B. 22  
C. 26  
D. 28

3. A sequence is shown below.

\[ 2, 5, 8, 11, \ldots \]

Which explicit formula can be used to model the sequence?

A. \( a_n = 2 + 3(n - 1) \)  
B. \( a_n = 3 + 2(n - 1) \)  
C. \( a_n = 3 - 11(n - 1) \)  
D. \( a_n = 11 - 3(n - 1) \)
4. A sequence is shown below.

\[-3, -2, -1, 0, 1, \ldots\]

If \( n \) represents the position of the number in the sequence, which expression can be used to determine the \( n \)th term?

A. \( 2n - 4 \)
B. \( n - 4 \)
C. \( n + 1 \)
D. \( n - 3 \)

5. An arithmetic sequence is shown below.

\[5, 1, -3, -7, \ldots\]

Which explicit formula can be used to determine the \( n \)th term of the sequence?

A. \( a_n = -4n + 9 \)
B. \( a_n = -4n + 5 \)
C. \( a_n = -5n + 9 \)
D. \( a_n = -5n + 1 \)
6. Which function produces the same sequence as \( g_n = g_{n-1} + 2 \), where \( g_1 = 5 \)?

A. \( f(x) = 5x + 3 \), where \( x \) is an integer and \( x \geq 1 \)

B. \( f(x) = 5x + 2 \), where \( x \) is an integer and \( x \geq 1 \)

C. \( f(x) = 2x + 5 \), where \( x \) is an integer and \( x \geq 1 \)

D. \( f(x) = 2x + 3 \), where \( x \) is an integer and \( x \geq 1 \)

7. The function below describes an arithmetic sequence, where \( A(n) \) is the \( n \)th term and \( n \) is the term number.

\[
A(n) = 6 + 3(n - 1)
\]

Which table **best** fits the sequence?

A. 

<table>
<thead>
<tr>
<th>( n )</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>( A(n) )</td>
<td>6</td>
<td>12</td>
<td>15</td>
<td>18</td>
</tr>
</tbody>
</table>

B. 

<table>
<thead>
<tr>
<th>( n )</th>
<th>1</th>
<th>1.5</th>
<th>2</th>
<th>2.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>( A(n) )</td>
<td>6</td>
<td>7.5</td>
<td>9</td>
<td>10.5</td>
</tr>
</tbody>
</table>

C. 

<table>
<thead>
<tr>
<th>( n )</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>( A(n) )</td>
<td>6</td>
<td>9</td>
<td>12</td>
<td>15</td>
</tr>
</tbody>
</table>

D. 

<table>
<thead>
<tr>
<th>( n )</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>( A(n) )</td>
<td>9</td>
<td>12</td>
<td>15</td>
<td>18</td>
</tr>
</tbody>
</table>
8. Hannah is competing on a television trivia show. The sequence below shows the total amount of money she will earn for each question she answers correctly.

\$0.25, \$0.50, \$1.00, \$2.00, \ldots

Which explicit formula can Hannah use to determine the total amount of money she will earn if she answers \( n \) questions correctly?

A. \( a_n = 2n \)
B. \( a_n = n + 0.25 \)
C. \( a_n = (0.125)(2)^n \)
D. \( a_n = (0.250)(2)^n \)

9. Marcus dropped a ball from a height of 400 cm. The sequence below shows the height of the ball, in cm, during its first four bounces.

240, 144, 86.4, 51.84, ...

Which formula could be used to determine the height of the ball after \( n \) bounces?

A. \( h(n) = 400(0.60)^n \)
B. \( h(n) = 400(0.60)^{n-1} \)
C. \( h(n) = 240(0.60)^n \)
D. \( h(n) = 240(0.60)^{n-1} \)
10. Which type of numerical pattern is shown below, and what makes it that type of pattern?

\[0, \sqrt{1}, \sqrt{4}, \sqrt{9}, \sqrt{16}, \sqrt{25}, \sqrt{36}\]

A. geometric because the pattern increases
B. nonlinear because the pattern decreases
C. arithmetic because there is a constant change between terms
D. linear because the difference between the terms is not constant

11. In the sequence below, the same number is added to the previous term to get the next term.

\[3, 6, 9, 12, \ldots\]

Which expression can be used to represent the \(n\)th term of the sequence?

A. \(3n\)
B. \(n + 3\)
C. \(3n + 3\)
D. \(3 + 3 + n\)
12. The table below shows a pattern.

<table>
<thead>
<tr>
<th>Term</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>-1</td>
<td>2</td>
<td>7</td>
<td>14</td>
<td>23</td>
<td>?</td>
</tr>
</tbody>
</table>

Based on the table, which expression represents the value of the $n$th term of the pattern?

A. $n - 2$
B. $4n + 3$
C. $n^2 - 2$
D. $n^2 + 2$

13. Travis made a sequence using a rule where $n$ is the number of the term in the sequence. Terms 1 through 5 of Travis’s sequence are shown below.

\[
\frac{3}{4}, 1 \frac{3}{8}, 2, 2 \frac{5}{8}, 3 \frac{1}{4}
\]

Which expression is the rule Travis used to create the sequence?

A. \( \frac{n + 5}{8} \)
B. \( \frac{5n + 1}{8} \)
C. \( \frac{3n + 3}{8} \)
D. \( \frac{7n - 1}{8} \)
14. For the sequence 0, 1\( \frac{1}{2} \), 2\( \frac{2}{3} \), 3\( \frac{3}{4} \), 4\( \frac{4}{5} \), ..., which expression represents the \( n \)th term of the sequence?

A. \( n - \frac{1}{n} \)

B. \( -\frac{1}{2^n} \)

C. \( n + 1\frac{1}{2} \)

D. \( 2\frac{1}{2^n} \)

15. The first 5 terms of a number pattern are shown below.

4, 9, 14, 19, 24, ... 

Which expression is equivalent to the value of the \( n \)th term in the pattern?

A. \( n + 5 \)

B. \( 5n - 1 \)

C. \( 5n \)

D. \( 5n + 3 \)
16. Which expression can be used to find the $n$th term of the sequence shown in the table below?

<table>
<thead>
<tr>
<th>Position</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>$n$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value of Term</td>
<td>0.8</td>
<td>1.6</td>
<td>2.4</td>
<td>3.2</td>
<td></td>
</tr>
</tbody>
</table>

A. $0.8n$

B. $0.1n + 0.7$

C. $n - 0.8$

D. $n - 0.2$

17. In a geometric sequence the ratio of any term divided by the term before it is always the same.

$64, 16, 4, 1, \frac{1}{4}, \ldots$

What is the ratio in the geometric sequence shown above?

A. 4

B. 2

C. $\frac{1}{2}$

D. $\frac{1}{4}$
18. An arithmetic sequence is defined by:

\[ a_1 = -8 \]
\[ a_n = a_{n-1} + 4 \]

What is the 7th term of the sequence?

A. –44
B. –32
C. 16
D. 20

19. A geometric sequence is shown below.

3, 15, 75, 375, ...

What is the explicit formula for this sequence?

A. \( a_n = 3 \cdot 5^n \)
B. \( a_n = 5 \cdot 3^n \)
C. \( a_n = 3 \cdot 5^{n-1} \)
D. \( a_n = 5 \cdot 3^{n-1} \)
20. Jason studied how quickly ants consume things. He counted the number of ants on a banana peel at the end of each minute for five minutes. His results formed the pattern below.

12, 19, 26, 33, 40

Let $n$ represent the number of minutes since Jason began his study. Which expression could be used to predict the number of ants on the banana peel after $n$ minutes?

A. $7n$
B. $7 + 5n$
C. $5 + 7n$
D. $12n$

21. The 5th, 6th, and 7th terms of an arithmetic sequence are shown below.

$-10, -7, -4$

Which is an explicit formula for this sequence?

A. $f(n) = -3n - 25$
B. $f(n) = -3n - 19$
C. $f(n) = 3n - 19$
D. $f(n) = 3n - 25$
22. A sequence is defined by the equations \( a_1 = 5 \) and \( a_n = 3a_{n-1} \). What is the value of term \( a_4 \)?

A. 45  
B. 135  
C. 405  
D. 625

23. The frequencies for certain notes are shown in the table below.

<table>
<thead>
<tr>
<th>Note</th>
<th>Frequency (in hertz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>440.00</td>
</tr>
<tr>
<td>A Sharp</td>
<td>466.16</td>
</tr>
<tr>
<td>B</td>
<td>493.88</td>
</tr>
<tr>
<td>C</td>
<td>523.25</td>
</tr>
</tbody>
</table>

If the frequencies form a geometric sequence, what is the value of the common ratio rounded to the nearest hundredth?

A. 27.75  
B. 26.16  
C. 1.06  
D. 0.94
24. The first four triangular numbers are 1, 3, 6, and 10. Which expression can be used to find $n$th triangular number?

A. $n + 1$
B. $n + 2$
C. $n + 3$
D. $n \cdot 2$
25. A sequence is shown below.

4, 8, 16, 32, . . .

Which formula can be used to determine the

\( n \)

th term in the sequence?

A. \( a_n = 2(2)^n \)

B. \( a_n = 4(2)^n \)

C. \( a_n = 2n \)

D. \( a_n = 4n \)
26. An arithmetic sequence has these properties:

\[ a_1 = 2 \]
\[ a_n = a_{n-1} + 5 \]

What are the first four terms of the sequence?

A. 2, 5, 7, 12
B. 2, 7, 9, 14
C. 2, 5, 10, 15
D. 2, 7, 12, 17

27. A sequence is defined by the equations \( a_1 = 50 \) and \( a_n = a_{n-1} + 4 \). What is term \( a_5 \)?

A. 46
B. 41
C. 34
D. 30
28. A geometric sequence is shown below.

24, 12, 6, ...

Which is the explicit formula for this sequence?

A. \[ a_n = \frac{24}{2^n - 1} \]

B. \[ a_n = \frac{24}{2^{(n-1)} - 1} \]
24
- 1
2
n

C.

a
n = 24
(n (1 1 2))

D. a
n = 24
(n (1 2))
29. Which equation could be used to find the \( n \)th term in the sequence below?

\[ 2, 5, 8, 11, 14, \ldots \]

A. \( y = 3n - 1 \)
B. \( y = 3n - 3 \)
C. \( y = 3n + 2 \)
D. \( y = 2n + 1 \)
30. A pyramid is being built with cubes, as shown.

On the top layer is one cube. Under that is a layer of 4 cubes arranged in a square. The third layer has 9 cubes arranged in a square. If this pattern continues indefinitely, which expression gives the number of cubes in the \( n \)th layer?

A. \( n^2 \)

B. \( n^3 \)

C. \( 2n \)

D. \( n(n - 2) \)

31. Which recursive formula produces an arithmetic sequence where \( g_5 = 8 \) and \( g_{10} = 10 \)?

A. \( g_n = 1.06g_{n-1} \), where \( g_1 = 6 \)

B. \( g_n = 1.06g_{n-1} \), where \( g_1 = 6.4 \)

C. \( g_n = g_{n-1} + 0.4 \), where \( g_1 = 6 \)

D. \( g_n = g_{n-1} + 0.4 \), where \( g_1 = 6.4 \)
32. A geometric sequence has these properties:

\[ a_1 = 2 \]
\[ a_n = 5a_{n-1} \]

What is the third term of the sequence?

A. 50  
B. 35  
C. 25  
D. 20  

33. Which rule determines the values of each term in the sequence below, where \( n \) represents the position of the term in the sequence?

15, 13\( \frac{1}{2} \), 12, 10\( \frac{1}{2} \),…

A. \( -\frac{5}{2}n + 15\frac{1}{2} \)  
B. \( \frac{5}{2}n - 15\frac{1}{2} \)  
C. \( -\frac{3}{2}n + 16\frac{1}{2} \)  
D. \( \frac{3}{2}n - 16\frac{1}{2} \)
34. Determine the first three terms of the sequence and whether the given formula is explicit or recursive.

\[ a_n = \frac{1}{2} (n)(n-1), \quad n = 1, 2, 3,... \]

A. Explicit: 0, 1, 3
B. Explicit: 1, 3, 6
C. Recursive: 0, 1, 3
D. Recursive: 1, 3, 6

35. Which equation represents the formula for the general term, \( g_n \), of the geometric sequence \( 3, 1, \frac{1}{3}, \frac{1}{9}, \ldots \)?

A. \( g_n = \left(\frac{1}{3}\right)^{1-n} \)
B. \( g_n = \left(\frac{1}{3}\right)^{n-2} \)
C. \( g_n = (3)^{1-n} \)
36. The sequence below shows the height a ball bounced to after each time it hit the ground.

3, 2.25, 1.6875, . . .

Which formula could be used to determine the height of the ball after \( n \) bounces?

A. \( a_n = 3 - 0.75n \)
B. \( a_n = 4 - 0.75n \)
C. \( a_n = 3(0.75)^n \)
D. \( a_n = 4(0.75)^n \)

37. The number of mosquitoes in a small pool of stagnant water increases according to the pattern below.
Which expression represents any term in the pattern when \( n \) is the number of the term?

A. \( 4 + n \)

B. \( 4 + 3n \)

C. \( 3 + 4n \)

D. \( 4 + n^3 \)

38. A sequence is defined by the formula \( a_1 = 4 \) and \( a_n = a_{n-1} + 6 \) for \( n \) greater than 1. Which of the following describes \( a_8 \)?

39. Which process describes how the next term in the sequence below can be determined?
A. Add 1 to the current term to find the next term.

B. Square the current term and add 1 to find the next term.

C. Multiply the current term by 2 and add 1 to find the next term.

D. Multiply the current term by 3 and subtract 1 to find the next term.

40. Which rule can be used to find the value of any term in the sequence below where $n$ represents the position of the term?

<table>
<thead>
<tr>
<th>Position</th>
<th>Value of Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$2\cdot\frac{1}{4}$</td>
</tr>
<tr>
<td>2</td>
<td>$2\cdot\frac{1}{2}$</td>
</tr>
<tr>
<td>3</td>
<td>$2\cdot\frac{3}{4}$</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>$3\cdot\frac{1}{4}$</td>
</tr>
<tr>
<td>$n$</td>
<td></td>
</tr>
</tbody>
</table>

A. $\frac{1}{4}(n)$

B. $\frac{2n}{4}$

C. $\frac{n}{4} + 2$

D. $\frac{n}{2} + 1$
41. A sequence starting with 2.5 is shown below.

\[ 2.5, 5.0, 7.5, 10.0, \ldots, n \]

Which function represents the \( n \)th term of this sequence?

A. \( f(n) = n + 2.5 \)

B. \( f(n) = n - 2.5 \)

C. \( f(n) = 2.5n \)

D. \( f(n) = \frac{n}{2.5} \)

42. The 12th term of an arithmetic sequence is 87 and the 20th term is 135. Which number represents the value of the common difference, \( d \), of the sequence?

A. 4

B. 6

C. 8
43. Each step in the pattern below contains black dots and white dots. In every step that follows Step 1, first a column of white dots is added on the right and then a row of black dots is added at the bottom.

Which of the following expressions represents the number of black dots in Step \( n \)?

A. \( 3(n - 1) \)

B. \( \frac{n(n + 1)}{2} \)

C. \( \frac{n^2}{2} \)

D. \( \frac{(n + 1)^2}{2} \)

44. The table shows the number of handshakes that take place based on the number of people in a room.
Which algebraic expression can be used to find the number of handshakes for \( n \) people in a room?

A. \( 2n \)

B. \( n - 1 \)

C. \( \frac{n(n - 1)}{2} \)

D. \( \frac{n(n - 1)}{3} \)

45. For the sequence, \( 1, \frac{1}{4}, \frac{1}{9}, \frac{1}{16}, \ldots \), which expression represents the \( n \)th term of the sequence?

A. \( n \)

B. \( \frac{1}{n} \)

C. \( \frac{1}{n + 5} \)

D. \( \frac{1}{n^2} \)
46. Beginning with Step 2, the border of white dots in each step in the pattern below is one dot wider and one dot longer than the border in the previous step.

![Diagram of steps 1 to 4]

How many white dots are in the border of Step \( n \)?

A. \( n^2 \)
B. \( 2n + (n - 2) \)
C. \( 4n \)
D. \( 4n - 4 \)

47. The sequence \( a_1, a_2, a_3, \ldots \) is defined explicitly as \( a_n = -3n - 2 \).

What is the recursive form of this sequence?

/files/assess_files/96862d08-6c8d-4341-b514-8704d8f10b86/formula_sheets/FL-IBTP_Math_Reference_Sheet_Grade_9-12.pdf

FL-IBTP_Math_Reference_Sheet_Grade_9-12.pdf
48. Which expression could be used to find any term in the following pattern?

1, 8, 27, 64, . . .

A. $3^n$

B. $4^n$

C. $x^2$

D. $x^3$

49. Each step in the pattern below, after the first step, is obtained by adding 2 black dots to the previous step as shown.
Which of the following expressions represents the number of black dots in Step $n$ of this pattern?

A. $n + 1$

B. $n + 2$

C. $2n - 1$

D. $2n + 1$

50. The Snowflake Curve is a famous example of a complex curve created through a recursive process.

The curve itself cannot be drawn. It is the limit of a series of curves that grow more and more complex.

Snowflake Curve 1: This is the unit segment in the $xy$-coordinate plane, between $(0, 0)$ and $(1, 0)$.

Snowflake Curve 2: This is a set of 4 segments, from $(0, 0)$ to $\left(\frac{1}{3}, 0\right)$, to $\left(\frac{1}{2}, \frac{\sqrt{3}}{6}\right)$, to $\left(\frac{2}{3}, 0\right)$, and from there to $(1, 0)$. 
In general, for \( n > 0 \), the Snowflake Curve \( C_{n+1} \) replaces each segment in Curve \( n \) with four new segments, each one-third the length of the original, in the process forming an equilateral triangle at the center of each segment.

The length of the Snowflake curve increases at each iteration. What is the length of Snowflake Curve 9, to the nearest 0.01 unit?

A. 1.98
B. 3.67
C. 9.99
D. 13.32

51. The sequence below shows the number of raffle tickets that Samantha sold each day during a month.
Which explicit formula models the number of tickets Samantha sold on day \( x \)?

A. \( t(x) = x + 4 \)
B. \( t(x) = 3x + 4 \)
C. \( t(x) = 4x - 1 \)
D. \( t(x) = 4x + 3 \)

52. A sequence is defined by the following:

\[
\begin{align*}
a_1 &= 5 \\
a_n &= a_{n-1} + 7
\end{align*}
\]

What is term \( a_{10} \)?

A. 57
B. 68
C. 70
D. 75

53. A geometric sequence has these properties:

\[ a_1 = 4 \]
\[ a_n = \frac{1}{2}a_{n-1} \]

What is term \( a_7 \) of this sequence?

A. \( \frac{1}{16} \)
B. \( \frac{1}{14} \)
C. \( \frac{1}{12} \)
D. \( \frac{1}{8} \)

54. What is the \( n \)th term of the sequence below?

2, 6, 12, 20, . . .

A. \( 3n \)
B. \( n(n + 1) \)
55. If $A_1 = 3$ and $A_{n+1} = 2A_n$, which equation represents the explicit formula for the sequence?

A. $A_n = 2 \cdot 3^n$

B. $A_n = 2 \cdot 3^n - 1$

C. $A_n = 3 \cdot 2^n$

D. $A_n = 3 \cdot 2^n - 1$

56. Each step in the pattern below contains black squares and white circles. In each step after Step 1, a black square and a white circle are added.

Which of the following expressions represents the total number of objects (black squares and white circles) in Step $n$?
57. The pattern shown is based on the sum of the cubes of consecutive positive integers.

\[
\begin{align*}
1^3 &= 1 \\
1^3 + 2^3 &= 9 \\
1^3 + 2^3 + 3^3 &= 36 \\
1^3 + 2^3 + 3^3 + 4^3 &= 100 \\
1^3 + 2^3 + 3^3 + 4^3 + 5^3 &= 225
\end{align*}
\]

Which conjecture generalizes this pattern for all positive integers, \(k\)?

A. \(\frac{k(k + 1)}{2}\)
B. \(\frac{(k + 1)^3}{3}\)
C. \(\frac{k^2(k + 1)^2}{4}\)
D. \(\frac{k(k + 1)^3}{5}\)

58. A pattern begins with two cubes and continues by adding a cube to each side as shown below.
Which function could be used to determine the number of exterior faces in stage $n$?

A. $f_n = f_{n-1} + 8$, where $f_1 = 10$

B. $f_n = f_{n-1} + 10$, where $f_1 = 8$

C. $f_n = 8 \times f_{n-1} + 2$, where $f_1 = 10$

D. $f_n = 10 \times f_{n-1} + 2$, where $f_1 = 8$

59. Leonard wrote the sequence of numbers below. 9, 15, 21, 27, . . . Which expression did he use to form the sequence, where $n$ is the term number?

A. $3n + 3$

B. $3n - 3$

C. $6n + 3$

D. $6n - 3$

60. In a geometric sequence, $g_3 = 1$ and $g_8 = 32$. Which recursive formula produces
this geometric sequence?

A. \( g_n = 2g_{n-1} \), where \( g_1 = 0.25 \)

B. \( g_n = 2g_{n-1} \), where \( g_1 = 0.125 \)

C. \( g_n = g_{n-1} + 6.2 \), where \( g_1 = -11.4 \)

D. \( g_n = g_{n-1} + 6.2 \), where \( g_1 = -17.6 \)

61. A sequence is shown below.

32, 26, 20, 14, ...

Which explicit formula can be used to determine the \( n \)th term of the sequence?

A. \( a_n = 6n + 38 \)

B. \( a_n = 6n + 32 \)

C. \( a_n = -6n + 38 \)

D. \( a_n = -6n + 32 \)

62. Which equation represents the formula for the general term, \( a_n \), of an
arithmetic sequence when \( a_1 = 3 \) and \( a_{11} = 23 \)?

A. \( a_n = 3 + 2(n - 1) \)

B. \( a_n = 3 + 23(n - 1) \)

C. \( a_n = 23 + 10(n - 1) \)

D. \( a_n = 23 + 2(n - 1) \)

63. A geometric sequence is defined by:

\[
\begin{align*}
  a_1 &= 10 \\
  a_n &= 2a_{n-1}
\end{align*}
\]

What are the first four terms of the sequence?

A. 10, 12, 14, 16

B. 10, 20, 30, 40

C. 10, 20, 40, 80

D. 10, 12, 24, 48

64. Which equation represents the formula for the general term, \( a_n \), of an arithmetic sequence with a first term of 8 and a common difference of 0.3?

A. \( a_n = 7.7 - 0.3n \)

B. \( a_n = 7.7 + 0.3n \)
65. In a sequence, each number after the first number is obtained by adding 4 to the previous number. If the first number in the sequence is 7, which of the following expressions represents the \( n \)th number in the sequence?

A. \( 7 + 4n \)

B. \( 7 + (4n - 1) \)

C. \( 7 + 4(n - 1) \)

D. \( 7 + 4(n + 1) \)

66. Regina counted the numbers of emails she received during the first five days she used her new account. The results are recorded in the table below.

<table>
<thead>
<tr>
<th>Day</th>
<th>Number of Emails</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>4</td>
<td>19</td>
</tr>
<tr>
<td>5</td>
<td>23</td>
</tr>
</tbody>
</table>

If the pattern established in the table continues, which expression would BEST predict the number of emails Regina receive on day \( n \)?

A. \( 3n + 4 \)
67. Which table BEST represents the relationship between $n$, the position of the term in a sequence, and the value of the term defined by the rule $5n - 3$?

A. 

<table>
<thead>
<tr>
<th>Position</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>$n$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value of Term</td>
<td>8</td>
<td>13</td>
<td>18</td>
<td>23</td>
<td></td>
</tr>
</tbody>
</table>

B. 

<table>
<thead>
<tr>
<th>Position</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>$n$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value of Term</td>
<td>2</td>
<td>-1</td>
<td>-4</td>
<td>-7</td>
<td></td>
</tr>
</tbody>
</table>

C. 

<table>
<thead>
<tr>
<th>Position</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>$n$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value of Term</td>
<td>2</td>
<td>7</td>
<td>12</td>
<td>17</td>
<td></td>
</tr>
</tbody>
</table>

D. 

<table>
<thead>
<tr>
<th>Position</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>$n$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value of Term</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

68. Which sequence is generated by the rule $3n - 1$, where $n$ represents the position of a term in the sequence?

A. 3, 6, 9, 12, 15 ...

B. 4, 7, 10, 13, 16 ...

C. 4, 5, 6, 7, 8, 9 ...
D. 2, 5, 8, 11, 14 ...

69. Which recursive formula describes the sequence 3, 15, −75, −375, 1875, ..., where \( n \) represents the number of terms in the pattern and \( f(1) = 3 \)?

\[ f(n) = 5f(n - 1) \]

A. \( f(n) = 5f(n - 1) \)

B. \( f(n) = -5f(n - 1) \)

C. \( f(n) = (-1)^n \cdot 5f(n - 1) \)

D. \( f(n) = (-1)^{n-1} \cdot 5f(n - 1) \)

70. The expression below describes a sequence of numbers.

\[ 7n \]

If \( n \) represents the position of the number in the sequence, which pattern of numbers does the expression describe?

A. 7, 14, 21, 28, . . .

B. 10, 11, 12, 13, . . .

C. 17, 27, 37, 47, . . .
D. 21, 28, 35, 42, . . .

71. Which recursive function describes the sequence
5, -5, 0, -10, -20, -60, -160, -440...?

A. $f(0) = 5, f(1) = -5, f(n + 1) = -2(f(n - 2) + f(n - 1))$ for $n \geq 2$
B. $f(0) = 5, f(1) = -5, f(n + 1) = 2(f(n - 2) + f(n - 1))$ for $n \geq 2$
C. $f(1) = 5, f(2) = -5, f(n) = -2(f(n - 2) + f(n - 1))$ for $n \geq 2$
D. $f(1) = 5, f(2) = -5, f(n) = 2(f(n - 2) + f(n - 1))$ for $n \geq 2$

72. Which function, defined recursively, describes the sequence
2, -4, 16, -256, 65536 ..., where $n$ represents the number of terms in the pattern and $f(1) = 2$?

A. $f(n) = (-1)^n [f(n - 1)]^2$, where $n \geq 2$
73. Janeane counts the number of oranges that ripen on her orange trees each week. In the following sequence, $b_1 = 2$ and $b_2 = 4$: Each week, there have been more ripened oranges than the previous week.

2, 4, 8, 12, 18, 24, 32, ...

Which formula accurately models this sequence?

A. $b_1 = 2, b_2 = 4$;
   
   $b_n = b_{n-1} + b_{n-2}$

B. $b_1 = 2, b_2 = 4$;
   
   $b_n = 2n + b_{n-2}$

C. $b_1 = 2, b_2 = 4$;
   
   $b_n = 2(n - 1) + b_{n-1}$

D. $b_1 = 2, b_2 = 4$;
74. Which sequence is generated by the rule $b_n = 2n + b_{n-1}$ where $n$ represents the position of a term in the sequence?

A. 8, 10, 12, 14, 16, ...

B. 4, 2, 0, −2, −4, ...

C. 6, 8, 10, 12, 14, ...

D. 4, 10, 16, 22, 28, ...

75. Which statement is true for a sequence defined recursively as

\[ f(n) = (-1)^n \cdot f(n - 1) \]

where $f(1) = 1$ and $n \geq 2$?

A. All the terms in the sequence are positive.

B. All the terms in the sequence are negative.

C. Terms that are a multiple of 2 are always positive.

D. Terms that are a multiple of 4 are always negative.
76. A sequence is defined by the function \( f(n) = f(n-1) + 5 \), where \( n \) represents the number of the term for \( n > 1 \), and \( f(1) = -4 \). What are the first four terms of the sequence?

A. 1, 6, 11, 15
B. -4, 0, -1, -2
C. 0, -1, -2, -3
D. -4, 1, 6, 11

77. Look at the pattern shown below.

2, 4, 16, 256 ...

What is \( f(n + 1) \) in terms of \( f(n) \), where \( n \) represents the position of a term in this pattern?

A. \((f(n))^2\)
B. \(2f(n)\)

C. \((f(n) - 1)^2\)

D. \(2(f(n) - 1)\)

Which recursive formula describes the sequence \(1, -1, 0, -\frac{1}{2}, \frac{1}{4}, -\frac{1}{8}, \ldots\) where \(n\) represents the number of the terms, \(f(1) = 1\), and \(f(2) = -1\)?

A. \(f(n + 1) = \frac{f(n) + f(n - 1)}{2}\)

B. \(f(n + 1) = \frac{f(n) - f(n - 1)}{2}\)

C. \(f(n + 1) = (-1)^{n+1} \frac{f(n) + f(n - 1)}{2}\)

D. \(f(n + 1) = (-1)^n \frac{f(n) - f(n - 1)}{2}\)