

F.BF.A.1: Sequences 1

- 1 Given: the sequence 4, 7, 10, 13, ...
When using the arithmetic sequence formula $a_n = a_1 + (n - 1)d$ to determine the 10th term, which variable would be replaced with the number 3?
- 1) a_1
 - 2) n
 - 3) a_n
 - 4) d

- 2 What is the n th term of the sequence -1, 3, 7, 11, ...?
- 1) $a_n = -1 - 4(n - 1)$
 - 2) $a_n = -1 + 4(n - 1)$
 - 3) $a_n = 4 - (n - 1)$
 - 4) $a_n = 4 + (n - 1)$

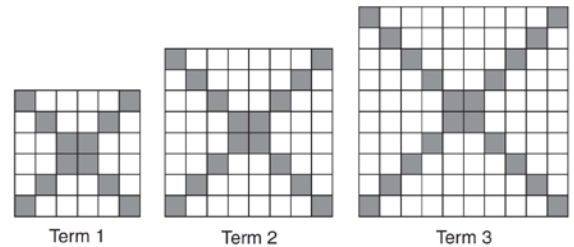
- 3 For the sequence -27, -12, 3, 18, ..., the expression that defines the n th term where $a_1 = -27$ is
- 1) $15 - 27n$
 - 2) $15 - 27(n - 1)$
 - 3) $-27 + 15n$
 - 4) $-27 + 15(n - 1)$

- 4 The third term in an arithmetic sequence is 10 and the fifth term is 26. If the first term is a_1 , which is an equation for the n th term of this sequence?
- 1) $a_n = 8n + 10$
 - 2) $a_n = 8n - 14$
 - 3) $a_n = 16n + 10$
 - 4) $a_n = 16n - 38$

- 5 In an arithmetic sequence, $a_4 = 19$ and $a_7 = 31$. Determine a formula for a_n , the n^{th} term of this sequence.

- 6 A theater has 35 seats in the first row. Each row has four more seats than the row before it. Which expression represents the number of seats in the n th row?
- 1) $35 + (n + 4)$
 - 2) $35 + (4n)$
 - 3) $35 + (n + 1)(4)$
 - 4) $35 + (n - 1)(4)$

- 7 The diagrams below represent the first three terms of a sequence.



Assuming the pattern continues, which formula determines a_n , the number of shaded squares in the n th term?

- 1) $a_n = 4n + 12$
 - 2) $a_n = 4n + 8$
 - 3) $a_n = 4n + 4$
 - 4) $a_n = 4n + 2$
- 8 What is a formula for the n th term of sequence B shown below?
- $$B = 10, 12, 14, 16, \dots$$
- 1) $b_n = 8 + 2n$
 - 2) $b_n = 10 + 2n$
 - 3) $b_n = 10(2)^n$
 - 4) $b_n = 10(2)^{n-1}$

- 9 A sequence has the following terms: $a_1 = 4$, $a_2 = 10$, $a_3 = 25$, $a_4 = 62.5$. Which formula represents the n th term in the sequence?
- 1) $a_n = 4 + 2.5n$
 - 2) $a_n = 4 + 2.5(n - 1)$
 - 3) $a_n = 4(2.5)^n$
 - 4) $a_n = 4(2.5)^{n-1}$

- 10 The formula of the n th term of the sequence 3, -6, 12, -24, 48, ... is
- 1) $a_n = -2(3)^n$
 - 2) $a_n = 3(-2)^n$
 - 3) $a_n = -2(3)^{n-1}$
 - 4) $a_n = 3(-2)^{n-1}$

- 11 What is the formula for the n th term of the sequence 54, 18, 6, ...?
- 1) $a_n = 6\left(\frac{1}{3}\right)^n$
 - 2) $a_n = 6\left(\frac{1}{3}\right)^{n-1}$
 - 3) $a_n = 54\left(\frac{1}{3}\right)^n$
 - 4) $a_n = 54\left(\frac{1}{3}\right)^{n-1}$

- 12 In a sequence, the first term is 4 and the common difference is 3. The fifth term of this sequence is
- 1) -11
 - 2) -8
 - 3) 16
 - 4) 19

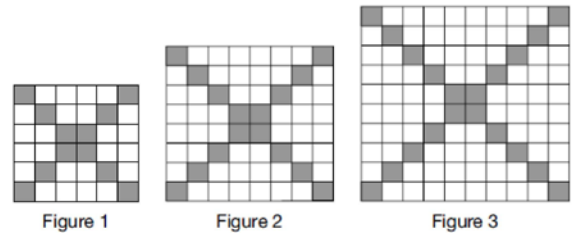
- 13 An arithmetic sequence has a first term of 10 and a sixth term of 40. What is the 20th term of this sequence?
- 1) 105
 - 2) 110
 - 3) 124
 - 4) 130

- 14 The 24th term of the sequence $-5, -11, -17, -23, \dots$ is
- 1) -149
 - 2) -143
 - 3) 133
 - 4) 139

- 15 Determine the common difference of the arithmetic sequence in which $a_1 = 5$ and $a_5 = 17$. Determine the 21st term of this sequence.

- 16 On the main floor of the Kodak Hall at the Eastman Theater, the number of seats per row increases at a constant rate. Steven counts 31 seats in row 3 and 37 seats in row 6. How many seats are there in row 20?
- 1) 65
 - 2) 67
 - 3) 69
 - 4) 71

- 17 The shaded boxes in the figures below represent a sequence.



If figure 1 represents the first term and this pattern continues, how many shaded blocks will be in figure 35?

- 1) 55
- 2) 148
- 3) 420
- 4) 805

- 18 Simon lost his library card and has an overdue library book. When the book was 5 days late, he owed \$2.25 to replace his library card and pay the fine for the overdue book. When the book was 21 days late, he owed \$6.25 to replace his library card and pay the fine for the overdue book. Suppose the total amount Simon owes when the book is n days late can be determined by an arithmetic sequence. Determine a formula for a_n , the n th term of this sequence. Use the formula to determine the amount of money, in dollars, Simon needs to pay when the book is 60 days late.
- 19 In a geometric sequence, the first term is 4 and the common ratio is -3 . The fifth term of this sequence is
- 1) 324
 - 2) 108
 - 3) -108
 - 4) -324
- 20 The eleventh term of the sequence $3, -6, 12, -24, \dots$, is
- 1) -3072
 - 2) -6144
 - 3) 3072
 - 4) 6144
- 21 What is the fifteenth term of the sequence $5, -10, 20, -40, 80, \dots$?
- 1) $-163,840$
 - 2) $-81,920$
 - 3) 81,920
 - 4) 327,680
- 22 The seventh term of the geometric sequence $\sqrt{6}, -2\sqrt{3}, 2\sqrt{6}, -4\sqrt{3}, \dots$ is
- 1) $6\sqrt{6}$
 - 2) $-6\sqrt{3}$
 - 3) $8\sqrt{6}$
 - 4) $-8\sqrt{3}$
- 23 What is the fifteenth term of the geometric sequence $-\sqrt{5}, \sqrt{10}, -2\sqrt{5}, \dots$?
- 1) $-128\sqrt{5}$
 - 2) $128\sqrt{10}$
 - 3) $-16384\sqrt{5}$
 - 4) $16384\sqrt{10}$
- 24 When a ball bounces, the heights of consecutive bounces form a geometric sequence. The height of the first bounce is 121 centimeters and the height of the third bounce is 64 centimeters. To the nearest centimeter, what is the height of the fifth bounce?
- 1) 25
 - 2) 34
 - 3) 36
 - 4) 42
- 25 The eighth and tenth terms of a sequence are 64 and 100. If the sequence is either arithmetic or geometric, the ninth term can *not* be
- 1) -82
 - 2) -80
 - 3) 80
 - 4) 82

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Answer Section

1 ANS: 4
 $31 = 4 + (10 - 1)3$

REF: 062118ai

2 ANS: 2 REF: 061624a2

3 ANS: 4 REF: 081820ai

4 ANS: 2 REF: 081416ai

5 ANS:

$$\frac{31 - 19}{7 - 4} = \frac{12}{3} = 4 \quad x + (4 - 1)4 = 19 \quad a_n = 7 + (n - 1)4$$

$$x + 12 = 19$$

$$x = 7$$

REF: 011434a2

6 ANS: 4 REF: 061520a2

7 ANS: 2 REF: 061424ai

8 ANS: 1

common difference is 2. $b_n = x + 2n$

$$10 = x + 2(1)$$

$$8 = x$$

REF: 081014a2

9 ANS: 4

$$\frac{10}{4} = 2.5$$

REF: 011217a2

10 ANS: 4 REF: 011715a2

11 ANS: 4 REF: 061026a2

12 ANS: 3

$$a_n = 3n + 1$$

$$a_5 = 3(5) + 1 = 16$$

REF: 061613ai

13 ANS: 3

$$\frac{40 - 10}{6 - 1} = \frac{30}{5} = 6 \quad a_n = 6n + 4$$

$$a_{20} = 6(20) + 4 = 124$$

REF: 081510a2

14 ANS: 2

$$a_{24} = -5 + (24 - 1)(-6) = -143$$

REF: 062305ai

15 ANS:

$$d = \frac{17-5}{5-1} = 3; a_{21} = 5 + (21 - 1)(3) = 65$$

REF: 082330ai

16 ANS: 1

$$d = \frac{37-31}{6-3} = 2 \quad a_n = 2n + 25$$

$$a_{20} = 2(20) + 25 = 65$$

REF: 061807ai

17 ANS: 2

$$a_n = 4n + 8$$

$$a_{35} = 4(35) + 8 = 148$$

REF: 012008ai

18 ANS:

$$\frac{6.25 - 2.25}{21 - 5} = \frac{4}{16} = \$0.25 \text{ fine per day. } 2.25 - 5(.25) = \$1 \text{ replacement fee. } a_n = 1.25 + (n - 1)(.25). a_{60} = \$16$$

REF: 081734aii

19 ANS: 1

$$a_5 = 4(-3)^{5-1} = 324$$

REF: 012317ai

20 ANS: 3

$$a_{11} = 3(-2)^{11-1} = 3072$$

REF: 012404ai

21 ANS: 3

$$a_n = 5(-2)^{n-1}$$

$$a_{15} = 5(-2)^{15-1} = 81,920$$

REF: 011105a2

22 ANS: 3

$$r = \frac{-2\sqrt{3}}{\sqrt{6}} = \frac{-2}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{-2\sqrt{2}}{2} = -\sqrt{2} \quad a_7 = \sqrt{6}(-\sqrt{2})^{7-1} = \sqrt{6}(-\sqrt{2})^6 = \sqrt{6} \cdot 2^3 = 8\sqrt{6}$$

REF: 012410aii

23 ANS: 1

$$a_n = -\sqrt{5}(-\sqrt{2})^{n-1}$$

$$a_{15} = -\sqrt{5}(-\sqrt{2})^{15-1} = -\sqrt{5}(-\sqrt{2})^{14} = -\sqrt{5} \cdot 2^7 = -128\sqrt{5}$$

REF: 061109a2

24 ANS: 2

$$121(b)^2 = 64 \quad 64\left(\frac{8}{11}\right)^2 \approx 34$$

$$b = \frac{8}{11}$$

REF: 011904aii

25 ANS: 1

$$d = 18; r = \pm\frac{5}{4}$$

REF: 011714aii