F.BF.A.1: Sequences

1 Given: the sequence $4, 7, 10, 13, \ldots$
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 3) a_n
2) n 4) d

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

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

4 The equation that represents the sequence $-2, -5, -8, -11, -14, \ldots$ is
1) $a_n = -3 + (-2)(n-1)$ 3) $a_n = 3 + (-2)(n-1)$
2) $a_n = -2 + (-3)(n-1)$ 4) $a_n = -2 + (3)(n-1)$

5 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 nth term of this sequence?
1) $a_n = 8n + 10$ 3) $a_n = 16n + 10$
2) $a_n = 8n - 14$ 4) $a_n = 16n - 38$

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

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

8 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 3) 124
2) 110 4) 130

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

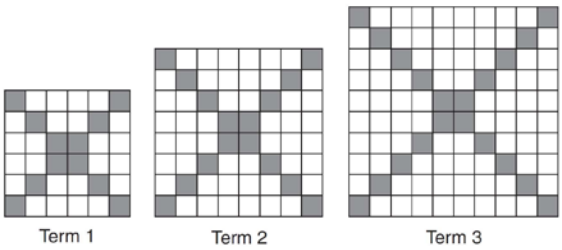
10 In an arithmetic sequence, the first term is 25 and the third term is 15. What is the tenth term in this sequence?
1) -20 3) 70
2) -25 4) 75

11 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 nth row?
1) $35 + (n + 4)$ 3) $35 + (n + 1)(4)$
2) $35 + (4n)$ 4) $35 + (n - 1)(4)$

12 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

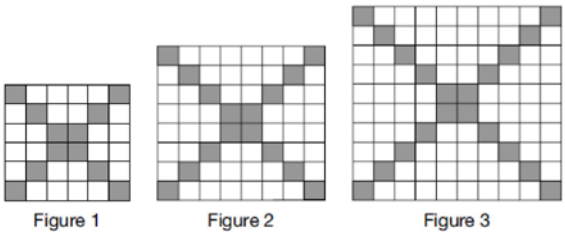
13 The diagrams below represent the first three terms of a sequence.



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) $a_n = 4n + 2$

14 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

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

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

17 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) $a_n = 4(2.5)^{n-1}$

18 What is the formula for the *n*th term of the sequence $54, 18, 6, \ldots$?

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) $a_n = 54\left(\frac{1}{3}\right)^{n-1}$

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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: 062415ai
5 ANS: 2 REF: 081416ai
6 ANS: 1
common difference is 2. $b_n = x + 2n$

$10 = x + 2(1)$

$8 = x$

REF: 081014a2
7 ANS: 3
$a_n = 3n + 1$

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

REF: 061613ai
8 ANS: 3
$\frac{40 - 10}{6 - 1} = \frac{30}{5} = 6$ $a_n = 6n + 4$

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

REF: 081510a2
9 ANS: 2
$a_{24} = -5 + (24 - 1)(-6) = -143$

REF: 062305ai
10 ANS: 1
$\frac{15 - 25}{3 - 1} = \frac{-10}{2} = -5$ $a_{10} = 25 + (10 - 1)(-5) = 25 - 45 = -20$

REF: 012508ai
11 ANS: 4 REF: 061520a2
12 ANS: 1
$d = \frac{37 - 31}{6 - 3} = 2$ $a_n = 2n + 25$

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

REF: 061807ai

13 ANS: 2 REF: 061424ai

14 ANS: 2

$a_n = 4n + 8$

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

REF: 012008ai

15 ANS:

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

$x + 12 = 19$

$x = 7$

REF: 011434a2

16 ANS:

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

REF: 082330ai

17 ANS: 4

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

REF: 011217a2

18 ANS: 4 REF: 061026a2