F.BF.A.2: Sequences 3

1 Given the function $f(n)$ defined by the following:

$$f(1) = 2$$

$$f(n) = -5f(n-1) + 2$$

Which set could represent the range of the function?

1) $\{2, 4, 6, 8, \ldots\}$
2) $\{2, -8, 42, -208, \ldots\}$
3) $\{-8, -42, -208, 1042, \ldots\}$
4) $\{-10, 50, -250, 1250, \ldots\}$

2 If $f(1) = 3$ and $f(n) = -2f(n-1) + 1$, then $f(5) =$

1) -5
2) 11
3) 21
4) 43

3 If a sequence is defined recursively by $f(0) = 2$ and $f(n+1) = -2f(n) + 3$ for $n \geq 0$, then $f(2)$ is equal to

1) 1
2) -11
3) 5
4) 17

4 Which function defines the sequence $-6, -10, -14, -18, \ldots$, where $f(6) = -26$?

1) $f(x) = -4x - 2$
2) $f(x) = 4x - 2$
3) $f(x) = -x + 32$
4) $f(x) = x - 26$

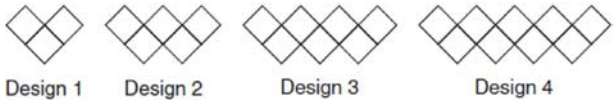
5 Given $f(9) = -2$, which function can be used to generate the sequence $-8, -7.25, -6.5, -5.75, \ldots$?

1) $f(n) = -8 + 0.75n$
2) $f(n) = -8 - 0.75(n-1)$
3) $f(n) = -8.75 + 0.75n$
4) $f(n) = -0.75 + 8(n-1)$

6 Which recursively defined function has a first term equal to 10 and a common difference of 4?

1) $f(1) = 10$
   $f(x) = f(x-1) + 4$
2) $f(1) = 4$
   $f(x) = f(x-1) + 10$
3) $f(1) = 10$
   $f(x) = 4f(x-1)$
4) $f(1) = 4$
   $f(x) = 10f(x-1)$

7 If the pattern below continues, which equation(s) is a recursive formula that represents the number of squares in this sequence?



1) $y = 2x + 1$

2) $y = 2x + 3$

3) $a_1 = 3$
$a_n = a_{n-1} + 2$

4) $a_1 = 1$
$a_n = a_{n-1} + 2$

8 Given the pattern below, which recursive formula represents the number of triangles in this sequence?

1) $y = 2x + 3$

2) $y = 3x + 2$

3) $a_1 = 2$
$a_n = a_{n-1} + 3$

4) $a_1 = 3$
$a_n = a_{n-1} + 2$

9 Which recursively defined function represents the sequence $3, 7, 15, 31, \ldots$?

1) $f(1) = 3,\ f(n+1) = 2^{f(n)} + 3$

2) $f(1) = 3,\ f(n+1) = 2^{f(n)} - 1$

3) $f(1) = 3,\ f(n+1) = 2f(n) + 1$

4) $f(1) = 3,\ f(n+1) = 3f(n) - 2$

10 A sunflower is 3 inches tall at week 0 and grows 2 inches each week. Which function(s) shown below can be used to determine the height, $f(n)$, of the sunflower in n weeks?

I. $f(n) = 2n + 3$
II. $f(n) = 2n + 3(n - 1)$
III. $f(n) = f(n-1) + 2$ where $f(0) = 3$

1) I and II

2) II, only

3) III, only

4) I and III

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Answer Section

1 ANS: 2
$f(1) = 2$; $f(2) = -5(2) + 2 = -8$; $f(3) = -5(-8) + 2 = 42$; $f(4) = -5(42) + 2 = -208$

REF: 061718ai

2 ANS: 4
$f(1) = 3; f(2) = -5; f(3) = 11; f(4) = -21; f(5) = 43$

REF: 081424ai

3 ANS: 3
$f(0 + 1) = -2f(0) + 3 = -2(2) + 3 = -1$

$f(1 + 1) = -2f(1) + 3 = -2(-1) + 3 = 5$

REF: 011520ai

4 ANS: 1 REF: 081610ai
5 ANS: 3 REF: 061720aii
6 ANS: 1 REF: 081514ai
7 ANS: 3 REF: 011818ai
8 ANS: 4 REF: 062121ai
9 ANS: 3 REF: 011618ai
10 ANS: 4 REF: 061421ai