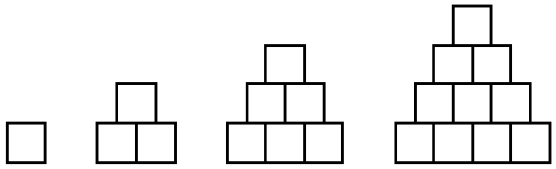
Name: _____

## F.IF.A.3 Sequences 2b

1 A sequence of blocks is shown in the diagram below.



This sequence can be defined by the recursive function $a_1 = 1$ and $a_n = a_{n-1} + n$. Assuming the pattern continues, how many blocks will there be when $n = 7$?

2 In a sequence, the first term is 4 and the common difference is 3. The fifth term of this sequence is

3 What is the fifteenth term of the sequence $5, -10, 20, -40, 80, \ldots$?

4 An arithmetic sequence has a first term of 10 and a sixth term of 40. What is the 20th term of this sequence?

5 What is the fifteenth term of the geometric sequence $-\sqrt{5}, \sqrt{10}, -2\sqrt{5}, \ldots$?

6 The first four terms of the sequence with $a_1 = 40$ and $a_n = \frac{3}{4} a_{n-1}$ are

7 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?

8 The first four terms of the sequence defined by $a_1 = \frac{1}{2}$ and $a_{n+1} = 1 - a_n$ are

9 What is the fourth term of the sequence defined by $a_1 = 3xy^5$

$a_n = \left(\frac{2x}{y}\right) a_{n-1}$?

10 What is the third term of the recursive sequence below?

$$a_1 = -6$$

$$a_n = \frac{1}{2} a_{n-1} - n$$

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

12 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

13 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

14 Find the third term in the recursive sequence $a_{k+1} = 2a_k - 1$, where $a_1 = 3$.

15 Find the first four terms of the recursive sequence defined below.

$$a_1 = -3$$

$$a_n = a_{(n-1)} - n$$

16 Use the recursive sequence defined below to express the next three terms as fractions reduced to lowest terms.

$$a_1 = 2$$

$$a_n = 3\left(a_{n-1}\right)^{-2}$$

# F.IF.A.3 Sequences 2b
## Answer Section

1 ANS:
28
1, 3, 6, 10, 15, 21, 28, ...

REF: 081715ai

2 ANS:
16
$a_n = 3n + 1$

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

REF: 061613ai

3 ANS:
81,920
$a_n = 5(-2)^{n-1}$

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

REF: 011105a2

4 ANS:
124
$\frac{40-10}{6-1} = \frac{30}{5} = 6$ $a_n = 6n + 4$

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

REF: 081510a2

5 ANS:
$-128\sqrt{5}$
$a_n = -\sqrt{5}(-\sqrt{2})^{n-1}$

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

REF: 061109a2

6 ANS:
$40, 30, 22\frac{1}{2}, 16\frac{7}{8}$
$\frac{3}{4}(40) = 30$; $\frac{3}{4}(30) = 22.5$; $\frac{3}{4}(22.5) = 16.875$

REF: 081608a2

7 ANS:
$\{2, -8, 42, -208, \ldots\}$
$f(1) = 2;\ f(2) = -5(2) + 2 = -8;\ f(3) = -5(-8) + 2 = 42;\ f(4) = -5(42) + 2 = -208$

REF: 061718ai

8 ANS:
$\frac{1}{2}, \frac{1}{2}, \frac{1}{2}, \frac{1}{2}$

REF: 081520a2

9 ANS:
$24x^4y^2$
$a_4 = 3xy^5\left(\frac{2x}{y}\right)^3 = 3xy^5\left(\frac{8x^3}{y^3}\right) = 24x^4y^2$

REF: 061512a2

10 ANS:
$-\frac{11}{2}$
$a_2 = \frac{1}{2}(-6) - 2 = -5$
$a_3 = \frac{1}{2}(-5) - 3 = -\frac{11}{2}$

REF: 011623a2

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

REF: 081424ai

12 ANS:
5
$f(0+1) = -2f(0) + 3 = -2(2) + 3 = -1$
$f(1+1) = -2f(1) + 3 = -2(-1) + 3 = 5$

REF: 011520ai

13 ANS: 1
$d = 18;\ r = \pm\frac{5}{4}$

REF: 011714aii

14 ANS:
$a_1 = 3.\ a_2 = 2(3) - 1 = 5.\ a_3 = 2(5) - 1 = 9.$

REF: 061233a2

15 ANS:
$-3, -5, -8, -12$

REF: fall0934a2

16 ANS:

$a_2 = 3(2)^{-2} = \frac{3}{4} \quad a_3 = 3\left(\frac{3}{4}\right)^{-2} = \frac{16}{3} \quad a_4 = 3\left(\frac{16}{3}\right)^{-2} = \frac{27}{256}$

REF: 011537a2