

Name _____

MES44QC-Series

1.

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. $f(n) = 2n + 3$

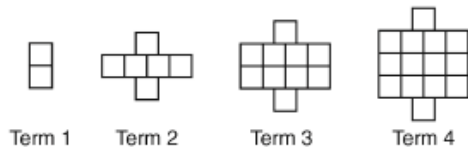
II. $f(n) = 2n + 3(n - 1)$

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

- (1) I and II (3) III, only
 (2) II, only (4) I and III

3.

A pattern of blocks is shown below.



Term 1 Term 2 Term 3 Term 4

If the pattern of blocks continues, which formula(s) could be used to determine the number of blocks in the n th term?

I	II	III
$a_n = n + 4$	$a_1 = 2$ $a_n = a_{n-1} + 4$	$a_n = 4n - 2$

- (1) I and II (3) II and III
 (2) I and III (4) III, only

5.

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

$$f(1) = 2$$

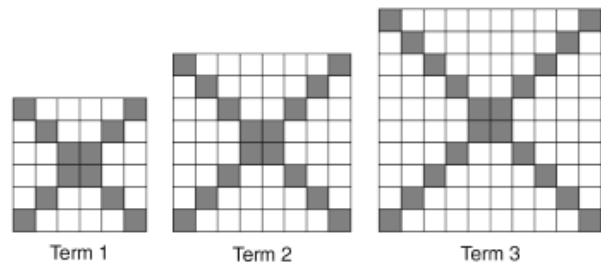
$$f(n) = -5f(n - 1) + 2$$

Which set could represent the range of the function?

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

2.

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) $a_n = 4n + 12$ (3) $a_n = 4n + 4$
 (2) $a_n = 4n + 8$ (4) $a_n = 4n + 2$

4.

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

6.

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) $a_n = 8n + 10$ (3) $a_n = 16n + 10$
 (2) $a_n = 8n - 14$ (4) $a_n = 16n - 38$

7.

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

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

9.

Alicia has invented a new app for smart phones that two companies are interested in purchasing for a 2-year contract.

Company A is offering her \$10,000 for the first month and will increase the amount each month by \$5000.

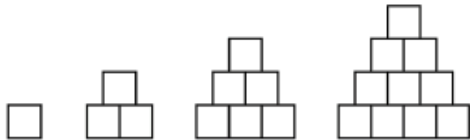
Company B is offering \$500 for the first month and will double their payment each month from the previous month.

Monthly payments are made at the end of each month. For which monthly payment will company B's payment first exceed company A's payment?

- (1) 6 (3) 8
 (2) 7 (4) 9

11.

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 $n = 7$?

- (1) 13 (3) 28
 (2) 21 (4) 36

8.

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

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

10.

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

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