DAYSPRING INTERNATIONAL ACADEMY

Mathletics for Lower Secondary

Read the questions *carefully*. Answer the questions in the spaces provided on the question sheets. If you run out of room for an answer, continue on the back of the page.

Student's Name: _____

Instructor's Name: Nana Baah Akuffu

Time Allowed: 10 minutes

1. If the $6 - n$ is the position-to-term rule of a sequence, give the first 5 terms of this sequence.

   Solution:
   5 4 3 2 1 ...

2. If $A = 2(l + b)$, find A when $l = 4$ and $b = 3$.

   Solution:
   $A = 2(l + b) = 2(4 + 3) = 2 \times 7 = 14$.

3. Find the n^{th} of the sequence, $10 \quad 6 \quad 2 \quad -2 \quad -6 \quad \ldots$

   Solution:
   The n^{th} term 10 and the term-to-term is -4. Therefore,

   $$T_n = a + (n-1)d = 10 + (n-1) \times (-4) = 10 - 4n + 4 = 14 - 4n.$$

4. What is the next term of the sequence $-6 \quad -2 \quad 2 \quad 6 \quad \ldots$?

   Solution:
   10

5. The fourth term of a sequence is 8. If the term-to-term rule is subtract -4, what is the first term?

Solution:
-4

6. What is the next term of the sequence, $1 \quad 4 \quad 9 \quad 16 \quad \ldots$?

Solution:
25

7. If the general rule of a sequence is $2n - 1$, find the 10^{th} term.

Solution:
In this case, $n = 10$, so, $2n - 1 = 2(10) - 1 = 20 - 1 = 19$.

8. Neil has a box containing n number of pencils. Write an expression for the number of pencils left if he tales away half of the pencils?

Solution:
$n - \frac{n}{2}$

9. An expression is of the form $x - 2y$. Find the value of this expression if $x = 2$ and $y = -2$.

Solution:
$x - 2y = 2 - 2(-2) = 2 + 4 = 6$.

10. A pattern contains 4 triangles at first place, 7 triangles at second place and 10 triangle at third place. How many triangles will there be at 5^{th} place?

Solution:
15

11. A function machine multiplies a number by 3 and then subtracts 3. What is the input if the output is 9?

Solution:
4

12. Faith thinks of a number n. Write an expression for the number Paul gets in each of the following sentences;

    1. He multiplies the number by 4.
    2. He subtracts 6 from the number.
    3. He multiplies the number by 3 then adds 5.
    4. He divides the number by 6 then subtracts 1.

Solution:

1. $4n$
2. $n - 6$
3. $3n + 5$
4. $\frac{n}{6} - 1$

13. A function adds 4 and then divides by 3. If the input is 10, what is the output?

Solution:
$\frac{14}{3}$

14. Find the inverse of the function;

$$y = \frac{x - 2}{3}$$

Solution:
$3x + 2$

15. Amy is x years old. Tom is 2 years older than Amy. Write an expression for Tom's age.

Solution:
$x + 2$

16. What is the term-to-term rule of the sequence,

$$1 \quad -1 \quad 1 \quad -1 \quad 1 \ldots$$

Solution:
Multiply by -1

17. Michelle has the formula given by

$$v^2 = u^2 + 2as.$$

She substitutes $v = 4$, $u = 3$, and $a = 7$ into the formula and she gets the equation $8 = 6 + 14s$. Is she right? Explain your answer.

Solution:

18. Write out the first 5 terms of the sequence, whose first term is 7 and the term-to-term rule is 'add 3'.

Solution:
7 10 13 16 19 ...

19. *Challenge Problem.* If n is an even number, then;

    1. write an expression for the next 2 consecutive even numbers.
    2. write an expression for the even number that comes immediately before n.

Solution:

1. $n+2$, $n+4$.
2. $n-2$.