NTH TERM – PRACTICE QUESTIONS

1.

Find the nth term of the following sequences:

(a) 5, 7, 9, 11, ... $2n + 3$

(b) 7, 12, 17, 22, ... $5n + 2$

(c) 10, 13, 16, 19, ... $3n + 7$

(d) 4, 10, 16, 22, ... $6n - 2$

(e) 5, 13, 21, 29, ... $8n - 3$

(f) 9, 20, 31, 42, ... $11n - 2$

(g) 11, 18, 25, 32, ... $7n + 4$

(h) 9, 7, 5, 3, ... $-2n + 11$

(i) 23, 19, 15, 11, ... $-4n + 27$

(j) 12, 7, 2, -3, ... $-5n + 17$

(k) -7, -4, -1, 2, ... $3n - 10$

(l) -11, -1, 9, 19, ... $10n - 21$

(m) 63, 55, 47, 39, ... $-8n + 71$

(n) 10, 24, 38, 52, ... $14n - 4$

(o) 7, 27, 47, 67, ... $20n - 13$

2.
(a) Find the nth term of the sequence 6, 11, 16, 21, ...

$$5n + 1$$

(b) Use your nth term formula to find the 50th term in the sequence.

$$5 \times 50 + 1 = 251$$

3.
(a) Find the nth term of the sequence 12, 15, 18, 21, ...

$$3n + 9$$

(b) Use your nth term formula to find the 20th term in the sequence.

$$3 \times 20 + 9 = 69$$

4.
(a) Find the nth term of the sequence 7, 15, 23, 31, ...

$$8n - 1$$

(b) Use your nth term formula to find the 50th term in the sequence.

$$8 \times 50 - 1 = 399$$

5.
(a) Find the nth term of the sequence 5, 14, 23, 32, ...

$$9n - 4$$

(b) Use your nth term formula to find the 100th term in the sequence.

$$9 \times 100 - 4 = 896$$

6.
(a) Find the nth term of the sequence 20, 17, 14, 11, ...

$$-3n + 23$$

(b) Use your nth term formula to find the 50th term in the sequence.

$$-3 \times 50 + 23 = -127$$

7.

(a) Find the nth term of the sequence 6, 10, 14, 18, ...

$$4n+2$$

(b) Is 90 in the sequence?

$$4n + 2 = 90$$
$$-2 \qquad\qquad -2$$
$$4n = 88$$
$$\div 4 \qquad\qquad \div 4$$
$$n = 22$$

<u>Yes</u>

(c) Is 164 in the sequence?

$$4n + 2 = 164$$
$$-2 \qquad\qquad -2$$
$$4n = 162$$
$$\div 4 \qquad\qquad \div 4$$
$$n = 40.5$$

<u>No</u>

8.

(a) Find the nth term of the sequence 5, 16, 27, 38, ...

$$11n - 6$$

(b) Is 114 in the sequence?

$$11n - 6 = 114$$
$$+6 \qquad\qquad +6$$
$$11n = 120$$
$$\div 11 \qquad\qquad \div 11$$
$$n = 10.90$$

<u>No</u>

(c) Is 258 in the sequence?

$$11n - 6 = 258$$
$$+6 \qquad\qquad +6$$
$$11n = 264$$
$$\div 11 \qquad\qquad \div 11$$
$$n = 24$$

<u>Yes</u>

9.

(a) Find the nth term of the sequence 11, 17, 23, 29, ...

$$6n + 5$$

(b) Is 203 in the sequence?

$$6n + 5 = 203$$
$$-5 \qquad\qquad -5$$
$$6n = 198$$
$$\div 6 \qquad\qquad \div 6$$
$$n = 33$$

<u>Yes</u>

10.
(a) Find the nth term of the sequence 9, 16, 23, 30, ...

$$7n + 2$$

(b) Use your nth term formula to find the 100th term in the sequence.

$$7 \times 100 + 2 = 702$$

(c) Is 149 in the sequence?

$$7n + 2 = 149$$
$$-2 \qquad\qquad -2$$
$$7n = 147$$
$$\div 7 \qquad\qquad \div 7$$
$$n = 21$$

<u>Yes</u>

11.
(a) Find the nth term of the sequence 1, 7, 13, 19, ...

$$6n - 5$$

(b) Use your nth term formula to find the 40th term in the sequence.

$$6 \times 40 - 5 = 235$$

347
(c) Is ~~358~~ in the sequence?

$$6n - 5 = 347$$
$$+5 \qquad\qquad +5$$
$$6n = 352$$
$$\div 6 \qquad\qquad \div 6$$
$$n = 58.\dot{6}$$

<u>No</u>

12.
(a) Find the nth term of the sequence 10, 19, 28, 37, ...

$$9n + 1$$

(b) Use your nth term formula to find the 200th term in the sequence.

$$9 \times 200 + 1 = 1801$$

(c) Is 176 in the sequence?

$$9n + 1 = 176$$
$$-1 \qquad\qquad -1$$
$$9n = 175$$
$$\div 9 \qquad\qquad \div 9$$
$$n = 19.4$$

<u>No</u>

13.
(a) Find the nth term of the sequence 31, 28, 25, 22, ...

$$-3n + 34$$

(b) Use your nth term formula to find the 50th term in the sequence.

$$-3 \times 50 + 34 = -116$$

(c) Is -40 in the sequence?

$$-3n + 34 = -40$$

$$-34 \qquad \qquad -34$$

$$\div 3 \qquad -3n = -74 \qquad \div -3$$

$$n = 24.\dot{6} \qquad \underline{No}$$

14.
(a) Find the nth term of the sequence -19, -13, -7, -1, ...

$$6n - 25$$

(b) Use your nth term formula to find the 100th term in the sequence.

$$6 \times 100 - 25 = 575$$

(c) Is 125 in the sequence?

$$6n - 25 = 125$$

$$+25 \qquad \qquad +25$$

$$6n = 150$$

$$\div 6 \qquad \qquad \div 6$$

$$n = 25 \qquad \underline{Yes}$$

15.
(a) Find the nth term of the sequence 15, 33, 51, 69, ...

$$18n - 3$$

(b) Use your nth term formula to find the 25th term in the sequence.

$$18 \times 25 - 3 = 447$$

(c) Is 555 in the sequence?

$$18n - 3 = 555$$

$$+3 \qquad \qquad +3$$

$$18n = 558$$

$$\div 18 \qquad \qquad \div 18$$

$$n = 31 \qquad \underline{Yes}$$

16.
A sequence has nth term 3n + 7.

Find the difference between the 5th and 20th terms in the sequence.

$$n = 5, \quad 5 \times 3 + 7 = 22$$
$$n = 20, \quad 20 \times 3 + 7 = 67$$

$$67 - 22 = 45$$

17.
A sequence has nth term 4n – 5.

Carl says "26 is a term in the sequence".
Is Carl correct?

$$+5 \quad 4n - 5 = 26 \quad +5$$
$$4n = 31$$
$$\div 4 \qquad \div 4$$
$$n = 7.75 \qquad \text{No, Carl is incorrect}$$

18.
The first three terms of a linear sequence are 8, 17 and 26.

(a) Find the 20th term in the sequence.

$$9n - 1 \qquad 9 \times 20 - 1 = 179$$

(b) Find the difference between the 25th and 30th terms in the sequence.

$$n = 25, \quad 9 \times 25 - 1 = 224$$
$$n = 30, \quad 9 \times 30 - 1 = 269 \qquad 269 - 224 = 45$$

19.
A sequence has nth term $n^2 + 11$.

Find the difference between the 5th and 8th terms in the sequence.

$$n = 5, \quad 5^2 + 11 = 36$$
$$n = 8, \quad 8^2 + 11 = 75$$

$$75 - 36 = 39$$

20.

A sequence has nth term 3n + q.
The first term in the sequence is 11.

(a) Find q.

$n=1:\ 3\times1+q=11$
$3+q=11 \qquad q=8$

(b) Hence find the 12th term in the sequence.

$3n+8$

$n=12:\ 3\times12+8=$

21.

A and B are linear sequences.
The first three terms of Sequence A are 7, 15 and 23.
Sequence B has nth term 4n + 2.

Rob says "There is a number that appears in both sequences".
Explain why Rob is incorrect.

A: $8n-1$
B: $4n+2$

He is incorrect because all numbers in
sequence A are odd and sequence B are
even.

22.

A sequence has nth term $3n^2$.

(a) Find the 10th term in the sequence.

$3\times10^2 = 300$

(b) Is 75 in the sequence?

$\div3\ \ 3n^2=75\ \ \div3 \qquad n=5 \qquad \underline{Yes}$

$\sqrt{}\ \ n^2=25\ \ \sqrt{}$

Another sequence has nth term $2n^2 - 5$.

(c) Show that the number 3 appears in both sequences.

$\div3\ \ 3n^2=3\ \ \div3$

$\sqrt{}\ \ n^2=1\ \ \sqrt{}$

$n=1$

$+5\ \ 2n^2-5=3\ \ +5$

$\div2\ \ 2n^2=8\ \ \div2$

$\sqrt{}\ \ n^2=4\ \ \sqrt{}$

$n=2$

3 appears in both
sequences.

23.
A sequence has nth term 4n + y.
The third term in the sequence is 9.

Find y.

$$n=3: \quad 4\times3+y=9$$
$$12+y=9$$
$$-12 \qquad\qquad -12$$
$$y=-3$$

24.
A linear sequence has nth term an + b.
The second term in the sequence is 16.
The fourth term in the sequence is 22.

Find a and b.

$$n=2: \quad a\times2+b=16 \qquad\qquad n=3: \quad a\times3+b=22$$
$$2a+b=16 \qquad\qquad\qquad 3a+b=22$$

$$\begin{array}{r} 3a+b=22 \\ - \quad 2a+b=16 \\ \hline a \qquad = 6 \end{array}$$

$$2\times6+b=16$$
$$-12 \quad 12+b=16 \quad -12$$
$$b=4$$

25.
Sequence X has nth term 4n – 7.
Sequence Y has nth term 20 – 3n.

Claire says "There is only one number that appears in both sequences".

Show that Claire is incorrect.

X: -3, 1, ⑤, 9, 13, ⑰ 21, ...
Y: ⑰ 14, 11, 8, ⑤ 2, -1, -4, ...

5 & 17 appear in both sequences.
Claire is incorrect.