WORKSHEET – Sequences **YEAR 8**

1. Write 4 more terms for each of the sequences below

a 3, 6, 9, 12, 15, …
b 2, 5, 8, 11, 14, …
c 1, 10, 100, 1000, 10 000, …
d 50, 44, 38, 32, 26, …
e $1, 1\frac{1}{2}, 2, 2\frac{1}{2}, 3, \ldots$
f 1024, 512, 256, 128, 64, …
g 2, 1.8, 1.6, 1.4, 1.2, …
h 1, 8, 27, 64, 125, …

2. For each sequence given,
   a. Fill in the missing term
   b. Find the general term

a 4, ☐, 14, 19, 24, …
b 2, ☐, ☐, 14, 18, …
c ☐, ☐, -1, -4, -7, …
d 5, ☐, 19, ☐, 33, …

3. Write the first four terms of each sequence below, whose general terms are given.

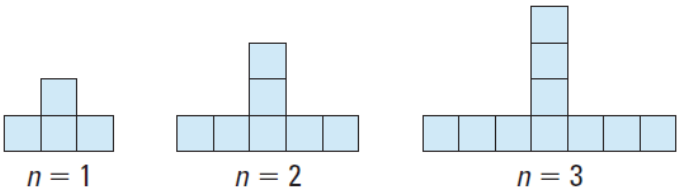
a $T(n) = n + 10$
b $T(n) = 2n$
c $T(n) = n - 5$
d $T(n) = \frac{n}{3}$
e $T(n) = 2n + 1$
f $T(n) = 10 - n$
g $T(n) = 5n - 2$
h $T(n) = 23 - 3n$

EXAMPLE:
$T(n) = 3n + 2$

$T(1) = 3(1) + 2 = 5$
$T(2) = 3(2) + 2 = 8$
$T(3) = 3(3) + 2 = 11$
$T(4) = 3(4) + 2 = 14$

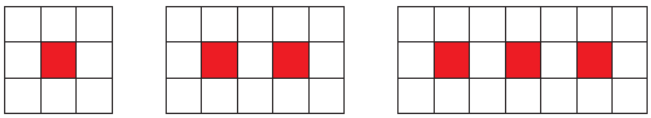
4. Given the pattern of tiles, answer the following

a For this pattern of tiles, find a rule that relates the pattern number, n, to the number of tiles, t.
b Use your formula to find the number of tiles in pattern number 100.
c Explain why your rule works by referring to the diagrams.



5. Given the pattern of tiles, answer the following

a For this pattern of tiles, find a rule that relates the number of red tiles, r, to the number of white tiles, w.
b Use your formula to find the number of tiles in pattern number 100.
c Explain why your rule works by referring to the diagrams.



6. **a** Which term of the sequence 5, 8, 11, 14, 17, … is the first one to be greater than 100?
   b Which term of the sequence 1, 8, 15, 22, 29, … is the first one to be greater than 200?
   c Which term of the sequence 4, 9, 14, 19, 24, … is the closest to 500?

Example: Which term of the sequence 3, 7, 11, 15,… is the first one to be greater than 80?

Solution: **Find the n^{th} term =>** common difference is 4 => n^{th} term starts with $4n$.

For n = 1, 4(1) = 4, but the first term is 3 => n^{th} term has to be **$4n - 1$**

Try to estimate => n = 20, 4(20) – 1 = 79 **X** n = 21, 4(21) – 1 = 83 ✓

7. The powers of 2 are 2^1, 2^2, 2^3, 2^4, 2^5, ...

This gives the sequence 2, 4, 8, 16, 32, ...

The nth term is given by 2^n.

a Continue the sequence for another five terms.

b Give the nth term of these sequences.

i 1, 3, 7, 15, 31, ...

ii 3, 5, 9, 17, 33, ...

iii 6, 12, 24, 48, 96, ...

8. **a** Pick any odd number.

Pick any other odd number.

Add the two numbers together. Is the answer odd or even?

Complete this table.

+	Odd	Even
Odd	Even	
Even		

b Pick any odd number.

Pick any other odd number.

Multiply the two numbers together. Is the answer odd or even?

Complete this table.

×	Odd	Even
Odd	Odd	
Even		

9. p is an odd number, q is an even number. State if the following are odd or even.

a $p + 1$ **b** $q + 1$ **c** $p + q$

d p^2 **e** $qp + 1$ **f** $(p + q)(p - q)$

g $q^2 + 4$ **h** $p^2 + q^2$ **i** p^3

(Hint: pick an odd number for p and an even number for q)