

## UNIT 12 *Number Patterns and Sequences*

## Mental Tests

### Mental Practice 12.1

Carry out the following sequences round the class  
Speed is crucial!

1. 2, 4, 6, 8, ...
2. 1, 3, 5, 7, ...
3. 3, 6, 9, 12, ...
4. 5, 10, 15, 20, ...
5. 1, 4, 7, 10, ...
6. 2, 6, 10, 14, ...
7. 50, 48, 46, 44, ...
8. 100, 95, 90, 85, ...
9. 40, 36, 32, 28, ...
10. 60, 57, 54, 51, ...

Elicit the rule for each when finished.

### Mental Practice 12.2

Again at speed, pupils in turn give the next number in the sequence defined by:

1. Add 3, starting point 2
2. Add 10, starting point 7
3. Add 5, starting point 1
4. Add 4, starting point 3
5. Add 6, starting point 4
6. Subtract 2, starting point 50
7. Subtract 3, starting point 30
8. Subtract 5, starting point 84
9. Subtract 8, starting point 80
10. Subtract 7, starting point 60

(Pupils should be encouraged to volunteer their own rules and starting points.)

### Mental Test 12.3

1. What are the next two numbers in the following sequences?
 

(a) 2, 4, 6, 8	(10, 12)
(b) 1, 4, 7, 10	(13, 16)
(c) 1, 2, 4, 7	(11, 16)
(d) 1, 4, 9, 16	(25, 36)
2. What is the 10th term of the sequence defined by:
 

(a) $u_n = 3n + 1$	(31)
(b) $u_n = n^2 - 1$	(99)
3. Find a formula for the  $n$ th term of the following sequences:
 

(a) 5, 10, 15, 20, ...	(5n)
(b) 20, 18, 16, 14, ...	(22 - 2n)
4. A sequence starts with the number 100. You subtract 10 to get the next number in the sequence.
 

(a) What are the first 4 numbers in the sequence?	(100, 90, 80, 70)
(b) Give an expression for the $n$ th number in the sequence.	(110 - 10n)

### Mental Test 12.4

1. What are the next two numbers in the following sequences?
 

(a) 1, 3, 5, 7	(9, 11)
(b) 2, 5, 8, 11	(14, 17)
(c) 2, 3, 5, 8	(12, 17)
(d) 2, 5, 10, 17	(26, 37)
2. What is the 20th term of the sequence defined by:
 

(a) $u_n = 40 - 2n$	(0)
(b) $u_n = n^2 - 1$	(399)
3. Find a formula for the  $n$ th term of the following sequences:
 

(a) 10, 20, 30, 40, ...	(10n)
(b) 30, 27, 24, 21, ...	(33 - 3n)
4. A sequence starts with the number 10. You add 5 to get the next number in the sequence.
 

(a) What are the first 4 numbers in the sequence?	(10, 15, 20, 25)
(b) Give an expression for the $n$ th number in the sequence.	(5 + 5n)