

## Section 1: Definitions and notation

### Solutions to Exercise level 1

1. (i)  $B$  is an increasing sequence.

(ii)  $D$  and  $E$  are decreasing sequences.

(iii)  $B$  is an arithmetic sequence, with common difference 3.  
 $D$  is an arithmetic sequence, with common difference -4.

(iv)  $A$  is a geometric sequence, with common ratio -3.  
 $E$  is a geometric sequence, with common ratio  $\frac{1}{2}$ .

(v)  $C$  is a periodic sequence, with period 6.

2. (i)  $a_1 = 3 \times 1 - 1 = 2$   
 $a_2 = 3 \times 2 - 1 = 5$   
 $a_3 = 3 \times 3 - 1 = 8$   
 $a_4 = 3 \times 4 - 1 = 11$

(ii)  $a_1 = 2 \times 3^1 = 6$   
 $a_2 = 2 \times 3^2 = 18$   
 $a_3 = 2 \times 3^3 = 54$   
 $a_4 = 2 \times 3^4 = 162$

(iii)  $a_1 = 1^2 = 1$   
 $a_2 = 2^2 = 4$   
 $a_3 = 3^2 = 9$   
 $a_4 = 4^2 = 16$

(iv)  $a_1 = (-1)^1 2^1 = -2$   
 $a_2 = (-1)^2 2^2 = 4$   
 $a_3 = (-1)^3 2^3 = -8$   
 $a_4 = (-1)^4 2^4 = 16$

## Edexcel A level Maths Sequences 1 Exercise solutions

$$(v) \quad a_1 = 2$$

$$a_2 = 2a_1 + 1 = 2 \times 2 + 1 = 5$$

$$a_3 = 2a_2 + 1 = 2 \times 5 + 1 = 11$$

$$a_4 = 2a_3 + 1 = 2 \times 11 + 1 = 23$$

$$(vi) \quad a_1 = 3$$

$$a_2 = 1 - a_1 = 1 - 3 = -2$$

$$a_3 = 1 - a_2 = 1 - (-2) = 3$$

$$a_4 = 1 - a_3 = 1 - 3 = -2$$

3. (i)  $u_5 = 0$ , and then next terms are 1, 2, 3

(ii)  $u_5 = \frac{1}{25}$ , and then next terms are  $\frac{1}{36}$ ,  $\frac{1}{49}$ ,  $\frac{1}{64}$

(iii)  $u_5 = -\frac{1}{32}$ , and then next terms are  $+\frac{1}{64}$ ,  $-\frac{1}{128}$ ,  $+\frac{1}{256}$

(iv)  $u_3 = -1$ ,  $u_4 = -3$ , and so  $u_5 = -4$  and then next terms are -7, -11, -18  
(this is an example of a Fibonacci sequence)