

# Chapter 6 Answers

## Exercise 6A

- 24, 29, 34  
Add 5 to previous term
- 2, -2, 2  
Multiply previous term by -1
- 18, 15, 12  
Subtract 3 from previous term
- 162, 486, 1458  
Multiply previous term by 3
- $\frac{1}{4}, -\frac{1}{8}, +\frac{1}{16}$   
Multiply previous term by  $-\frac{1}{2}$
- 41, 122, 365  
Multiply previous term by 3 then -1
- 8, 13, 21  
Add together the two previous terms
- $\frac{5}{9}, \frac{6}{11}, \frac{7}{13}$   
Add 1 to previous numerator,  
add 2 to previous denominator
- 2.0625, 2.03125, 2.015625  
Divide previous term by 2 then +1
- 24, 35, 48  
Add consecutive odd numbers to previous term

## Exercise 6B

- |                               |                     |                      |                        |
|-------------------------------|---------------------|----------------------|------------------------|
| <b>a</b> $U_1 = 5$            | $U_2 = 8$           | $U_3 = 11$           | $U_{10} = 32$          |
| <b>b</b> $U_1 = 7$            | $U_2 = 4$           | $U_3 = 1$            | $U_{10} = -20$         |
| <b>c</b> $U_1 = 6$            | $U_2 = 9$           | $U_3 = 14$           | $U_{10} = 105$         |
| <b>d</b> $U_1 = 4$            | $U_2 = 1$           | $U_3 = 0$            | $U_{10} = 49$          |
| <b>e</b> $U_1 = -2$           | $U_2 = 4$           | $U_3 = -8$           | $U_{10} = 1024$        |
| <b>f</b> $U_1 = \frac{1}{3}$  | $U_2 = \frac{1}{2}$ | $U_3 = \frac{3}{5}$  | $U_{10} = \frac{5}{6}$ |
| <b>g</b> $U_1 = -\frac{1}{3}$ | $U_2 = \frac{1}{2}$ | $U_3 = -\frac{3}{5}$ | $U_{10} = \frac{5}{6}$ |
| <b>h</b> $U_1 = -1$           | $U_2 = 0$           | $U_3 = 1$            | $U_{10} = 512$         |
- |             |            |             |             |
|-------------|------------|-------------|-------------|
| <b>a</b> 14 | <b>b</b> 9 | <b>c</b> 11 | <b>d</b> 9  |
| <b>e</b> 6  | <b>f</b> 9 | <b>g</b> 8  | <b>h</b> 14 |
| <b>i</b> 4  | <b>j</b> 5 |             |             |
- $U_n = 4n^2 + 4n = 4(n^2 + n)$  which is a multiple of 4
- $U_n = (n-5)^2 + 2 > 0$   $U_n$  is smallest when  $n = 5$  ( $U_n = 2$ )
- $a = 12, b = -22$
- $a = 1, b = 3, c = 0$
- $p = \frac{1}{2}, q = 5\frac{1}{2}$

## Exercise 6C

- |                           |                       |
|---------------------------|-----------------------|
| <b>a</b> 1, 4, 7, 10      | <b>b</b> 9, 4, -1, -6 |
| <b>c</b> 3, 6, 12, 24     | <b>d</b> 2, 5, 11, 23 |
| <b>e</b> 10, 5, 2.5, 1.25 | <b>f</b> 2, 3, 8, 63  |
| <b>g</b> 3, 5, 13, 31     |                       |
- |  |
|--|
| <b>a</b> $U_{k+1} = U_k + 2, U_1 = 3$                |
| <b>b</b> $U_{k+1} = U_k - 3, U_1 = 20$               |
| <b>c</b> $U_{k+1} = 2U_k, U_1 = 1$                   |
| <b>d</b> $U_{k+1} = \frac{U_k}{4}, U_1 = 100$        |
| <b>e</b> $U_{k+1} = -1 \times U_k, U_1 = 1$          |
| <b>f</b> $U_{k+1} = 2U_k + 1, U_1 = 3$               |
| <b>g</b> $U_{k+1} = (U_k)^2 + 1, U_1 = 0$            |
| <b>h</b> $U_{k+1} = \frac{U_k + 2}{2}, U_1 = 26$     |
| <b>i</b> $U_{k+2} = U_{k+1} + U_k, U_1 = 1, U_2 = 1$ |
| <b>j</b> $U_{k+1} = 2U_k + 2(-1)^{k+1}, U_1 = 4$     |

- |   |
|---|
| <b>a</b> $U_{k+1} = U_k + 2, U_1 = 1$               |
| <b>b</b> $U_{k+1} = U_k + 3, U_1 = 5$               |
| <b>c</b> $U_{k+1} = U_k + 1, U_1 = 3$               |
| <b>d</b> $U_{k+1} = U_k + \frac{1}{2}, U_1 = 1$     |
| <b>e</b> $U_{k+1} = U_k + 2k + 1, U_1 = 1$          |
| <b>f</b> $U_{k+1} = U_k - (-1)^k(2k + 1), U_1 = -1$ |
- a**  $3k + 2$       **b**  $3k^2 + 2k + 2$       **c**  $\frac{10}{3}, -4$
- a**  $4 - 2p$       **b**  $4 - 6p$       **c**  $p = -2$

## Exercise 6D

- Arithmetic sequences are **a, b, c, h, l**
- |                        |                               |
|------------------------|-------------------------------|
| <b>a</b> $23, 2n + 3$  | <b>b</b> $32, 3n + 2$         |
| <b>c</b> $-3, 27 - 3n$ | <b>d</b> $35, 4n - 5$         |
| <b>e</b> $10x, nx$     | <b>f</b> $a + 9d, a + (n-1)d$ |
- a** £5800      **b** £(3800 + 200m)
- |             |             |             |
|-------------|-------------|-------------|
| <b>a</b> 22 | <b>b</b> 40 | <b>c</b> 39 |
| <b>d</b> 46 | <b>e</b> 18 | <b>f</b> n  |

## Exercise 6E

- |                         |                          |
|-------------------------|--------------------------|
| <b>a</b> $78, 4n - 2$   | <b>b</b> $42, 2n + 2$    |
| <b>c</b> $23, 83 - 3n$  | <b>d</b> $39, 2n - 1$    |
| <b>e</b> $-27, 33 - 3n$ | <b>f</b> $59, 3n - 1$    |
| <b>g</b> $39p, (2n-1)p$ | <b>h</b> $-71x, (9-4n)x$ |
- |             |              |             |
|-------------|--------------|-------------|
| <b>a</b> 30 | <b>b</b> 29  | <b>c</b> 32 |
| <b>d</b> 31 | <b>e</b> 221 | <b>f</b> 77 |
- $d = 6$
- $a = 36, d = -3, 14$ th term
- 24
- $x = 5; 25, 20, 15$
- $x = \frac{1}{2}, x = 8$

## Exercise 6F

- |                |                        |                |
|----------------|------------------------|----------------|
| <b>a</b> 820   | <b>b</b> 450           | <b>c</b> -1140 |
| <b>d</b> -294  | <b>e</b> 1440          | <b>f</b> 1425  |
| <b>g</b> -1155 | <b>h</b> $21(11x + 1)$ |                |
- |             |                              |
|-------------|------------------------------|
| <b>a</b> 20 | <b>b</b> 25                  |
| <b>c</b> 65 | <b>d</b> 4 or 14 (2 answers) |
- 2550
- i** £222 500      **ii** £347 500
- 1683, 3267
- £9.03, 141 days
- $d = -\frac{1}{2}, -5.5$
- $a = 6, d = -2$

## Exercise 6G

- |                                      |                                     |
|--------------------------------------|-------------------------------------|
| <b>a</b> $\sum_{r=1}^{10} (3r + 1)$  | <b>b</b> $\sum_{r=1}^{30} (3r - 1)$ |
| <b>c</b> $\sum_{r=1}^{11} 4(11 - r)$ | <b>d</b> $\sum_{r=1}^{16} 6r$       |
- |               |              |
|---------------|--------------|
| <b>a</b> 45   | <b>b</b> 210 |
| <b>c</b> 1010 | <b>d</b> 70  |
- 19
- 49

**Mixed exercise 6H**

- 1** 5, 8, 11  
**2** 10  
**3** 2, 9, 23, 51  
**4 a** Add 6 to the previous term, i.e.  $U_{n+1} = U_n + 6$   
 (or  $U_n = 6n - 1$ )  
**b** Add 3 to the previous term, i.e.  $U_{n+1} = U_n + 3$   
 (or  $U_n = 3n$ )  
**c** Multiply the previous term by 3,  
 i.e.  $U_{n+1} = 3U_n$  (or  $U_n = 3^{n-1}$ )  
**d** Subtract 5 from the previous term,  
 i.e.  $U_{n+1} = U_n - 5$  (or  $U_n = 15 - 5n$ )  
**e** The square numbers ( $U_n = n^2$ )  
**f** Multiply the previous term by 1.2,  
 i.e.  $U_{n+1} = 1.2U_n$  (or  $U_n = (1.2)^{n-1}$ )

Arithmetic sequences are:

- a**  $a = 5, d = 6$   
**b**  $a = 3, d = 3$   
**d**  $a = 10, d = -5$
- 5 a** 81                      **b** 860  
**6 b** 5050  
**7** 32  
**8 a** £13 780  
**c** £42 198  
**9 a**  $a = 25, d = -3$       **b** -3810  
**10 a** 26 733                **b** 53 467  
**11 a** 5                        **b** 45  
**12 a**  $-4k + 15$   
**b**  $-8k^2 + 30k - 30$   
**c**  $-\frac{1}{4}, 4$   
**13 b** 1500 m  
**15 a**  $U_2 = 2k - 4, U_3 = 2k^2 - 4k - 4$   
**b** 5, -3  
**16 a** £2450  
**b** £59 000  
**c**  $d = 30$   
**17 a**  $d = 5$   
**b** 59  
**18 b**  $\frac{11k - 9}{3}$   
**c** 1.5  
**d** 415