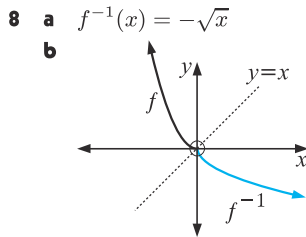
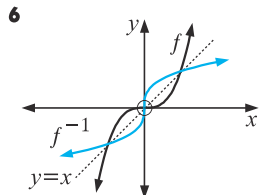
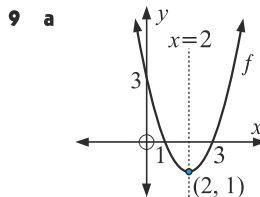


b No
c Yes, it is
 $y = \sqrt{x+4}$



7 b i is the only one



A horizontal line above the vertex cuts the graph twice. So, it does not have an inverse.

b For $x \geq 2$, all horizontal lines cut 0 or once only. \therefore has an inverse

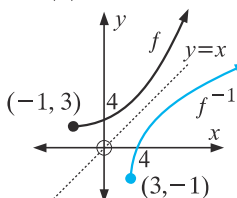
c Hint: Inverse is $x = y^2 - 4y + 3$ for $y \geq 2$

d i Domain is $\{x : x \geq 2\}$, Range is $\{y : y \geq -1\}$

ii Domain is $\{x : x \geq -1\}$, Range is $\{y : y \geq 2\}$

10 a $f^{-1}(x) = 2x + 2$ **b i** x **ii** x

11 a $f^{-1}(x) = \sqrt{x-3} - 1$, $x \geq 3$



c i Domain $\{x : x \geq -1\}$
 Range $\{y : y \geq 3\}$

ii Domain $\{x : x \geq 3\}$
 Range $\{y : y \geq -1\}$

12 a 10 **b** $x = 3$ **13 a i** 25 **ii** 16 **b** $x = 1$

14 $(f^{-1} \circ g^{-1})(x) = \frac{x+3}{8}$ and $(g \circ f)^{-1}(x) = \frac{x+3}{8}$

15 a Is not **b** Is **c** Is **d** Is **e** Is

EXERCISE 1G

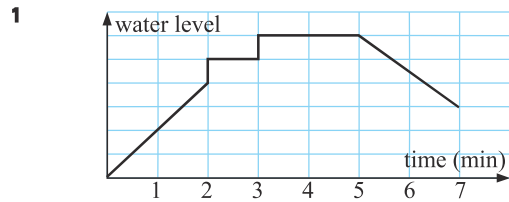
1 $f^{-1}(x) = \frac{x-1}{3}$ **2** $f^{-1}(x) = 4x - 3$

3 $f^{-1}(x) = x^2$ for $x \geq 0$

4 a B is $(f(x), x)$ **b** $x = f^{-1}(f(x)) = (f^{-1} \circ f)(x)$

c Start with B first and repeat the process used in **a** and **b**.

REVIEW SET 1A



2 a 0 **b** -15 **c** $-\frac{5}{4}$

3 a i Range = $\{y : y \geq -5\}$, Domain = $\{x : x \text{ is in } \mathcal{R}\}$

ii x -intercepts -1, 5; y -intercept $-\frac{25}{9}$ **iii** is a function

b i Range = $\{y : y = 1 \text{ or } -3\}$ Domain = $\{x : x \text{ is in } \mathcal{R}\}$

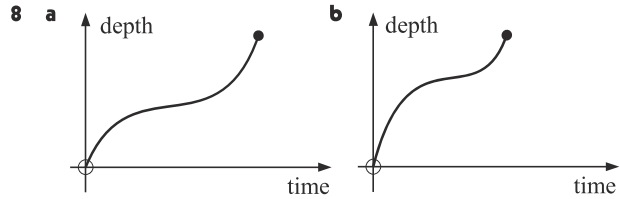
ii no x -intercepts; y -intercept 1 **iii** is a function

4 a Domain = $\{x : x \geq -2\}$, Range = $\{y : 1 \leq y < 3\}$

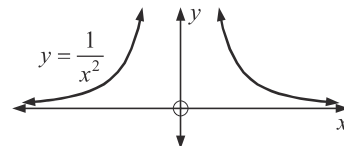
b Domain = $\{x \text{ is in } \mathcal{R}\}$, Range = $\{y : y = -1, 1 \text{ or } 2\}$

5 a $10 - 6x$ **b** $x = 2$ **6 a** $a = -6$, $b = 13$

7 $a = 1$, $b = -6$, $c = 5$



9 a $x = 0$ **b**



c Domain = $\{x : x \neq 0\}$, Range = $\{y : y > 0\}$

10 a $2x^2 + 1$ **b** $4x^2 - 12x + 11$

11 a $1 - 2\sqrt{x}$ **b** $\sqrt{1 - 2x}$

12 a $f(x) = \sqrt{x}$, $g(x) = 1 - x^2$

b $g(x) = x^2$, $f(x) = \frac{x-2}{x+1}$

REVIEW SET 1B

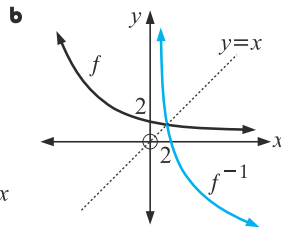
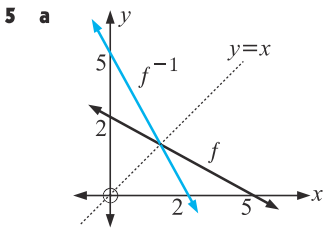
1 a 5 **b** -5 **c** 11 **d** 4

2 a $x^2 - x - 2$ **b** $x^4 - 7x^2 + 10$

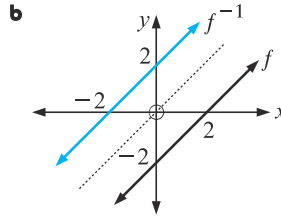
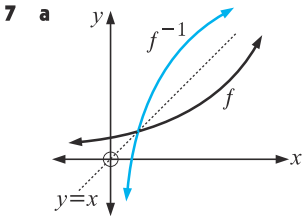
3 a $f^{-1}(x) = \frac{7-x}{4}$ **b** $f^{-1}(x) = \frac{5x-3}{2}$

4 a Domain $\{x : x \in \mathcal{R}\}$, Range $\{y : y \geq -4\}$

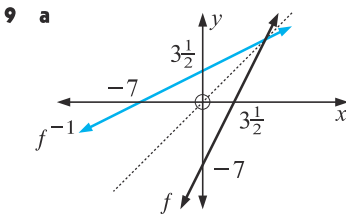
b Domain $\{x : x \neq 0, 2\}$, Range $\{y : y \leq -1 \text{ or } y > 0\}$



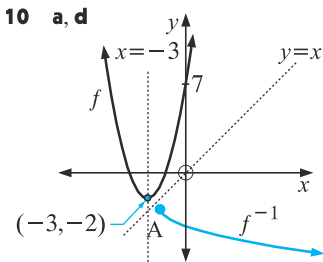
6 a $f^{-1}(x) = \frac{x-2}{4}$ **b** $f^{-1}(x) = \frac{3-4x}{5}$



8 16



b, c
 $f^{-1}(x) = \frac{x+7}{2}$



b If $x \leq -3$, we have the graph to the left of $x = -3$ and any horizontal line cuts it at most once.

c $y = -3 - \sqrt{x+2}$

11 $h^{-1}(x) = 4 + \sqrt{x-3}$

12 $(f^{-1} \circ h^{-1})(x) = x - 2$ and $(h \circ f)^{-1}(x) = x - 2$

EXERCISE 2A

- 1 a** 4, 13, 22, 31, ... **b** 45, 39, 33, 27, ...
c 2, 6, 18, 54, ... **d** 96, 48, 24, 12, ...
- 2 a** Starts at 8 and each term is 8 more than the previous term. Next two terms 40, 48.
b Starts at 2, each term is 3 more than the previous term; 14, 17.
c Starts at 36, each term is 5 less than the previous term; 16, 11.
d Starts at 96, each term is 7 less than the previous term; 68, 61.
e Starts at 1, each term is 4 times the previous term; 256, 1024.
f Starts at 2, each term is 3 times the previous term; 162, 486.
g Starts at 480, each term is half the previous term; 30, 15.
h Starts at 243, each term is $\frac{1}{3}$ of the previous term; 3, 1.
i Starts at 50 000, each term is $\frac{1}{5}$ of the previous term; 80, 16.

- 3 a** 79, 75 **b** 1280, 5120 **c** 81, 90
- 4 a** Each term is the square of the number of the term; 25, 36, 49.
b Each term is the cube of the number of the term; 125, 216, 343.
c Each term is $n \times (n+1)$ where n is the number of the term; 30, 42, 56.
- 5 a** 625, 1296 **b** 13, 21 **c** 9, 11 **d** 13, 17 (primes)
e 16, 22 **f** 14, 18

EXERCISE 2B

- 1 a** 2, 4, 6, 8, 10 **b** 4, 6, 8, 10, 12 **c** 1, 3, 5, 7, 9
d -1, 1, 3, 5, 7 **e** 5, 7, 9, 11, 13 **f** 13, 15, 17, 19, 21
g 4, 7, 10, 13, 16 **h** 1, 5, 9, 13, 17
i 9, 14, 19, 24, 29
- 2 a** 2, 4, 8, 16, 32 **b** 6, 12, 24, 48, 96
c $3, 1\frac{1}{2}, \frac{3}{4}, \frac{3}{8}, \frac{3}{16}$ **d** -2, 4, -8, 16, -32
- 3** 17, 11, 23, -1, 47

EXERCISE 2C

- 1 a** $u_1 = 6, d = 11$ **b** $u_n = 11n - 5$ **c** 545
d yes, u_{30} **e** no
- 2 a** $u_1 = 87, d = -4$, **b** $u_n = 91 - 4n$ **c** -69 **d** no
- 3 b** $u_1 = 1, d = 3$ **c** 169 **d** $u_{151} = 451$
- 4 b** $u_1 = 32, d = -\frac{7}{2}$ **c** -227 **d** $n \geq 68$
- 5 a** $k = 17\frac{1}{2}$ **b** $k = 4$ **c** $k = 4$ **d** $k = 0$
e $k = 3, k = -2$ **f** $k = 3, k = -1$
- 6 a** $u_n = 6n - 1$ **b** $u_n = -\frac{3}{2}n + \frac{11}{2}$ **c** $u_n = -5n + 36$
d $u_n = -\frac{3}{2}n + \frac{1}{2}$
- 7 a** $6\frac{1}{4}, 7\frac{1}{2}, 8\frac{3}{4}$ **b** $3\frac{5}{7}, 8\frac{3}{7}, 13\frac{1}{7}, 17\frac{6}{7}, 22\frac{4}{7}, 27\frac{2}{7}$
- 8 a** $u_1 = 36, d = -\frac{2}{3}$ **b** 100 **9** 100 006

EXERCISE 2D

- 1 a** $b = 18, c = 54$ **b** $b = 2\frac{1}{2}, c = 1\frac{1}{4}$ **c** $b = 3, c = -1\frac{1}{2}$
- 2 a** $u_1 = 5, r = 2$ **b** $u_n = 5 \times 2^{n-1}, u_{15} = 81 920$
- 3 a** $u_1 = 12, r = -\frac{1}{2}$ **b** $u_n = 12 \times (-\frac{1}{2})^{n-1}, u_{13} = \frac{3}{1024}$
- 4 a** $u_1 = 8, r = -\frac{3}{4}, u_{10} = -0.600 677 49$
- 5 a** $u_1 = 8, r = \frac{1}{\sqrt{2}}, u_n = 2^{\frac{1}{2}n - \frac{9}{2}}$
- 6 a** $k = \pm 14$ **b** $k = 2$ **c** $k = -2$ or 4
- 7 a** $u_n = 3 \times 2^{n-1}$ **b** $u_n = 32 \times (-\frac{1}{2})^{n-1}$
c $u_n = 3 \times (\sqrt{2})^{n-1}$ **d** $u_n = 10 \times (\sqrt{2})^{1-n}$
- 8 a** $u_9 = 13 122$ **b** $u_{14} = 2916\sqrt{3} \div 5050.66$
c $u_{18} \div 0.000 091 55$
- 9 a** \$3993.00 **b** \$993.00
- 10** 11 470.39 Yen **11 a** 43 923 Yen **b** 13 923 Yen
- 12** \$23 602.32 **13** 148 024.43 Yen **14** £51 249.06
- 15** \$14 976.01 **16** £11 477.02 **17** 19 712.33 Euro
- 18** 19 522.47 Yen
- 19 a i** 1550 ants **ii** 4820 ants **b** 12.2 weeks
- 20 a** 278 animals **b** Year 2037

EXERCISE 2E.1

- 1 a i** $S_n = 3 + 11 + 19 + 27 + \dots + (8n - 5)$ **ii** 95
b i $S_n = 42 + 37 + 32 + \dots + (47 - 5n)$ **ii** 160
c i $S_n = 12 + 6 + 3 + 1\frac{1}{2} + \dots + 12(\frac{1}{2})^{n-1}$ **ii** $23\frac{1}{4}$
d i $S_n = 2 + 3 + 4\frac{1}{2} + 6\frac{3}{4} + \dots + 2(\frac{3}{2})^{n-1}$ **ii** $26\frac{3}{8}$