Solutions

1   Introduction to Functions

1. (a) Yes
   (b) Yes
   (c) No
   (d) No
   (e) Yes
   (f) No

2. (a) Neither
   (b) Surjective
   (c) Bijective
   (d) Injective
   (e) Injective
   (f) Neither
   (g) Bijective
   (h) Injective

3. (a) Yes
   (b) Yes
   (c) No
   (d) No
   (e) Yes
   (f) No

1.1   Composition of Functions

1. i. 7
   ii. -32
   iii. 15
   iv. $8 - 10x$

2. i. 3
   ii. 11
   iii. 14
   iv. 195
   v. 63
   vi. 35
   vii. 74
   viii. 15

1.2   Inverse Functions

1. i. $f^{-1}(x) = \frac{x}{2}$
   ii. $g^{-1}(x) = x - 4$
   iii. $h^{-1}(x) = \frac{x+1}{2}$
   iv. $k^{-1}(x) = \frac{x-5}{3}$
   v. $f^{-1}(x) = \frac{2-x}{3}$

vi. $g^{-1}(x) = \frac{4}{x}$

vii. $h^{-1}(x) = \frac{1+2x}{x}$

viii. $k^{-1}(x) = \frac{5}{1-x}$

ix. $g^{-1}(x) = \frac{2x}{3x-2}$

x. $f^{-1}(x) = \frac{1}{x-1}$

2. i. $f^{-1}(x) = \sqrt{x+19} - 3, \quad x \geq -19$

ii. $f^{-1}(x) = \sqrt{x+9} + 2, \quad x \geq -9$

iii. $f^{-1}(x) = \sqrt{x+12} + 5, \quad x \geq -12$

iv. $f^{-1}(x) = \sqrt{x+8} - 4, \quad x \geq -8$

3. $f^{-1}(x) = 4 - 2x$
DOMAIN: $-1 \leq x \leq \frac{3}{2}$
RANGE: $1 \leq y \leq 6$

4. $A : x \leq 2$