

Functions

Exercise A

1 $f(x) = 2x - 1$ and $g(x) = x^2 + 2x$

Work out

(i) $f(-4)$ (ii) $f(0.6)$ (iii) $g(3)$ (iv) $g(-1)$ (v) $f(0)$ (vi) $g(0)$.

2 $f(x) = 3x^2$ and $g(x) = \frac{6}{x}$

Work out

(i) $f(2)$ (ii) $f(-5)$ (iii) $g(2)$ (iv) $g(-1.5)$ (v) $g\left(\frac{1}{2}\right)$ (vi) $g\left(-\frac{2}{3}\right)$.

3 $f(x) = 8 - 3x$ and $g(x) = 4(x + 3)$.

Solve

(i) $f(x) = 0$ (ii) $g(x) = 20$ (iii) $f(x) = g(x)$.

4 $h(x) = 3x - 2$

Work out expressions, giving answers in the simplest form, for

(i) $h(2x)$ (ii) $h(x + 1)$ (iii) $h(x^2)$.

5 $f(x) = x^2 + 5x - 1$

Work out expressions, giving answers in the simplest form, for

(i) $f(3x)$ (ii) $f(x - 2)$.

6 $g(x) = \frac{x + 6}{2x}$

(i) Work out $g(3)$. (ii) Solve $g(x) = 3$. (iii) Solve $g(2x) = 1$.

Exercise B

1. Given that,

$$f(x) = 2x - 3 \text{ and } g(x) = 4x + 1$$

find the following composite functions.

(a) $fg(x)$

(b) $gf(x)$

2. Given that,

$$f(x) = 3x + 1, \quad g(x) = 2x^2 - 4x + 1 \quad \text{and} \quad h(x) = \frac{2}{3x}$$

find the following composite functions.

(a) $fg(x)$

(b) $gf(x)$

(c) $gh(x)$

(d) $fh(x)$

(e) $hf(x)$

(f) $hg(x)$

(g) $f^2(x)$

3. Given that $f(x) = 2x - 1$, $g(x) = x^2 + 1$ and $h(x) = \frac{1}{3x}$

find the following.

(a) $fg(2)$

(b) $gh(-2)$

(c) $hf(-1)$

(d) $hg(3)$

(e) $gf(5)$

(f) $g^2(-3)$

4. For each of the following functions, find their inverse functions.

(a) $f(x) = 10x + 3$

(b) $g(x) = \frac{2x - 1}{3}$

(c) $h(x) = \frac{3x + 2}{x - 1}$

(d) $f(x) = \sqrt{5x + 4}$