

Functions

ANSWERS

Calculator | 30 minutes | Total marks: 27

Name Class

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

(a) Work out $f(3)$

Answer 11 (1) [1 mark]

(b) Work out $f(-4)$

Answer -3 (1) [1 mark]

(c) Solve $f(x) = 1$

$$2x + 5 = 1 \text{ (1)}$$

$x =$ -2 (1) [2 marks]

2 $g(x) = x^2 - 3$

(a) Work out $g(-2)$

Answer 1 (1) [1 mark]

(b) Solve $g(x) = 13$

$$x^2 = 16 \text{ (1)}$$

$x =$ 4 or -4 (1) [2 marks]

3

(a) $f(x) = 4x - 7$

Work out an expression for $f^{-1}(x)$

$$y = 4x - 7, \text{ so } x = \frac{y + 7}{4} \text{ (1)}$$

$$f^{-1}(x) = \frac{x + 7}{4} \text{ (1)} \quad [2 \text{ marks}]$$

(b) Work out $f^{-1}(5)$

Answer $3 \text{ (1)} \quad [1 \text{ mark}]$

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

Work out an expression for $h^{-1}(x)$

$$3y = x + 2 \text{ (1)}$$

$$h^{-1}(x) = \frac{3x - 2}{1} \text{ (1)} \quad [2 \text{ marks}]$$

4

$f(x) = 2x + 1$

$g(x) = x^2$

(a) Work out $fg(3)$

$$g(3) = 9 \text{ (1)}$$

Answer $19 \text{ (1)} \quad [2 \text{ marks}]$

(b) Work out $gf(3)$

$$f(3) = 7 \text{ (1)}$$

Answer $49 \text{ (1)} \quad [2 \text{ marks}]$

(c) Work out an expression for $fg(x)$

Answer $2x^2 + 1 \text{ (1)} \quad [1 \text{ mark}]$

(d) Work out an expression for $gf(x)$

Give your answer in the form $ax^2 + bx + c$

$$(2x + 1)^2 \text{ (1)}$$

Answer $4x^2 + 4x + 1 \text{ (1)} \quad [2 \text{ marks}]$

5

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

$$g(x) = x^2$$

Solve $fg(x) = gf(x)$

$$fg(x) = x^2 + 3 \quad (1)$$

$$gf(x) = (x + 3)^2 = x^2 + 6x + 9 \quad (1)$$

$$3 = 6x + 9 \quad (1)$$

$$x = \underline{-1} \quad (1)$$

[4 marks]

6

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

Work out an expression for $f^{-1}(x)$

$$y(x - 3) = 2x + 1 \quad (1)$$

$$xy - 2x = 3y + 1 \quad (1)$$

$$x(y - 2) = 3y + 1 \quad (1)$$

$$f^{-1}(x) = \underline{\frac{3x+1}{x-2}} \quad (1)$$

[4 marks]

Question	Topic	RAG
1	I can use function notation with a linear function	
2	I can use function notation with a quadratic function	
3	I can find an inverse function	
4	I can work with composite functions	
5	I can solve an equation with composite functions	
6	I can find the inverse of a harder function	