



eClassroom

GCSE Mathematics

Functions

Questions

Pearson Edexcel GCSE & iGCSE Mathematics



Section A — Foundation

Worked Examples

[Fluency]

This topic is assessed at Higher tier only.

Foundation students should be comfortable with substitution into expressions, which underpins this topic. Review PDF 1: Algebraic Notation & Substitution.

[Reasoning]

Review: Find the value of $3x + 1$ when $x = 4$.

$$3(4) + 1 = 13$$

[Problem Solving]

Review: Find x such that $2x + 1 = 9$.

$$2x = 8 \Rightarrow x = 4$$

Foundation students: practise the worked examples above, then attempt Section B.





Section B — Higher

Worked Examples

[Fluency]

$f(x) = 2x + 1$ and $g(x) = x^2 - 3$. Find $fg(x)$ and $gf(x)$.

$$fg(x) = f(x^2 - 3) = 2(x^2 - 3) + 1 = 2x^2 - 5$$

$$gf(x) = g(2x + 1) = (2x + 1)^2 - 3 = 4x^2 + 4x - 2$$

[Reasoning]

Find the inverse of $f(x) = 3x - 5$.

$$y = 3x - 5 \Rightarrow x = \frac{y+5}{3} \Rightarrow f^{-1}(x) = \frac{x+5}{3}$$

[Problem Solving]

Find the domain of $f(x) = 1/(x - 2)$.

$f(x)$ is undefined when $x - 2 = 0$, i.e. $x = 2$.

Domain: all real x , $x \neq 2$

[Fluency]

1.

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

- (a) Find $f(4)$. (1)
- (b) Find $f(-3)$. (1)
- (c) Find x such that $f(x) = 9$. (2)

(4 marks)

[Fluency]

2.

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

- (a) Find $g(2)$. (1)
- (b) Find $g(-2)$. (1)
- (c) Find x such that $g(x) = 22$. (2)

(4 marks)



**[Fluency]****3.**

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

- (a) Find $fg(x)$. (2)
- (b) Find $gf(x)$. (2)
- (c) Find $fg(2)$. (1)

(5 marks)**[Fluency]****4.**Find the inverse of $f(x) = 3x - 5$.**(3 marks)****[Fluency]****5.**

Find the inverse of:

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

(4 marks)**[Reasoning]****6.**

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

Solve $fg(x) = gf(x)$.**(5 marks)****[Reasoning]****7.**

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

- (a) Find $ff(x)$. (2)
- (b) Solve $ff(x) = x$. (3)

(5 marks)**[Reasoning]****8.**

$$f(x) = \sqrt{x - 2}$$

- (a) State the domain of $f(x)$. (1)
- (b) State the range of $f(x)$. (1)
- (c) Find $f'(x)$. (2)

(4 marks)

**[Reasoning]****9.**

$$f(x) = x^2 + 2x - 3$$

- (a) Write $f(x)$ in completed square form. (2)
- (b) State the minimum value of $f(x)$ and the value of x where it occurs. (2)
- (c) State the range of $f(x)$. (1)

(5 marks)**[Problem Solving]****10.**

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

- (a) Solve $f(x) = g(x)$. (3)
- (b) Show that $ff^1(x) = x$. (3)

(6 marks)