

Composite and inverse functions

Grade 7 | Higher | 13 questions, 58 marks

GCSE Maths topic practice



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

a. Find $f(5)$

b. Find $gf(2)$

(3 marks)

Answer _____

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

a. Find $f^{-1}(x)$

b. Find $f^{-1}(11)$

(3 marks)

Answer _____

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

a. Find $fg(3)$

b. Find $f^{-1}(x)$

(4 marks)

Answer _____

4

$$f(x) = 2x - 1 \quad g(x) = x^2 + 3$$

- Show that $gf(x) = 4x^2 - 4x + 4$
- Hence find $gf(3)$

(4 marks)

Answer _____

5

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

Express $f(x + 3)$ in the form $x^2 + bx + c$ where b and c are integers.

(3 marks)

Answer _____

6

$$f(x) = 3x + 2 \quad g(x) = x^2 - 4$$

- Find $f^{-1}(x)$
- Solve $gf(x) = 0$

(5 marks)

Answer _____

7 $f(x) = 4x - 1$ $g(x) = x^2 + 2$

- Find $fg(-3)$
- Find $gf(x)$, giving your answer in the form $ax^2 + bx + c$
- Find $f^{-1}(x)$

(5 marks)

Answer _____

8 $f(x) = x^2$ $g(x) = x + 2$

- Find $fg(x)$, giving your answer in the form $x^2 + bx + c$
- Solve $fg(x) = gf(x)$

(5 marks)

Answer _____

9 $f(x) = \frac{2x+1}{x-3}, x \neq 3$

a. Show that $f^{-1}(x) = \frac{3x+1}{x-2}$

b. $g(x) = x + 4$

Solve $fg(x) = 5$

(6 marks)

Answer _____

10 $f(x) = x + 2$ $g(x) = x^2 - 3x$

- Find $fg(1)$
- Find $f^{-1}(x)$
- Solve $gf(x) = 10$

(7 marks)

Answer _____

11 $f(x) = \frac{1}{x-4}$ and $g(x) = \sqrt{x+3}$

- State the value of x that must be excluded from the domain of f .
- State the largest possible domain of g .
- State the range of g .
- $fg(x)$ is not defined for one value of x in the domain of g . Find this value.

(4 marks)

Answer _____

12 $f(x) = 3x + 10$ and $g(x) = \sin x^\circ$

- Work out $fg(30)$.
- Work out $gf(20)$, correct to 3 decimal places.
- Ahmed solves $gf(x) = 0.5$ and writes " $3x + 10 = 30$, so $x = \frac{20}{3}$ is the only solution." Show that Ahmed is wrong by finding another solution between 40 and 50.

(5 marks)

Answer _____

13 $f(x) = x^2 - 6x + 11$ for all real x .

- Write $f(x)$ in the form $(x - a)^2 + b$.
- Hence state the range of f .
- Explain why f does not have an inverse function for all real x .

(4 marks)

Answer _____

End of questions | Total 58 marks