

5. Jun 89

Given that $f(x) = 5x$ and $g(x) = x - 2$,

- i. calculate $f(2)$ and $gf(2)$
- ii. determine x when $fg(x) = 0$
- iii. prove that $(gf)^{-1}23 = 5$

6. Jan 90

Given that $f : x \rightarrow \frac{x^2 - 14}{5x}$ and $x \neq 0$

- i. calculate $f(-4)$
- ii. obtain an expression for $fg(x)$ if $g : x \rightarrow x - 1$

7. Jan 91

a. Given $f : x \rightarrow 3x + 7$ and

$g : x \rightarrow \frac{4x}{5} - 9$, calculate $fg(10)$

b. Given that $h : x \rightarrow \frac{3x - 1}{x + 5}$ for $x \in \mathbb{R}$,

- i. State the value of x for which
 - a. $h(x) = 0$
 - b. $h(x)$ is unidentified.
- ii. determine $h^{-1}(x)$

Hence, solve the equation

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

8. Jan 92

The functions f , g and h are defined as follows

$$f : x \rightarrow x - 3$$

$$g : x \rightarrow x^2$$

$$h : x \rightarrow x^2 - 6x + 9$$

a. Given that $f^2(x) = f[f(x)]$ and $f^3(x) = f[f^2(x)]$ and so on,

- i. Deduce an algebraic expression in terms of x , for $f^4(x)$ and hence, calculate $f^4(3)$.
- ii. Show that $gf(x) = h(x)$

b. i. Determine the range values of $h(x)$ such that $h(x) > 1$

ii. Show that if $h(x) < 25$, then $-2 < x < 8$

c. Hence or otherwise, for $x \in \mathbb{R}$, determine the range of values of x for which $1 < h(x) < 25$ and represent your

answer on a number line.

9. Jun 91

The functions f and g are defined by:

$$f : x \rightarrow 5 + x$$

$$g : x \rightarrow x^3$$

Determine expressions for the functions:

- i. $fg(x)$
- ii. $g^{-1}(x)$

10. Jan 93

Determine the inverse of the functions

i. $f : x \rightarrow 2x + 5$

ii. $g : x \rightarrow \frac{x - 4}{3x}$

11. Jan 93

The functions f and g are defined by:

$$f : x \rightarrow x^3$$

$$g : x \rightarrow px + q$$

- a. Determine the value of x if $f(x) = -64$
- b. Given $g(0) = -5$, and $fg(2) = -8$, calculate the values of p and q .
- c. Given that $-8 < fg(x) < 27$, determine the domain of x :
 - i. If x is a real number
 - ii. If x is an integer

12. Jun 93

a composite function K is defined as

$$k(x) = (2x - 1)^2$$

- i. Express $k(x)$ as $gf(x)$, where $f(x)$ and $g(x)$ are two simpler functions
- ii. Show that $k^{-1}(x) = f^{-1}g^{-1}(x)$

13. Jan 95

The functions f and g are defined as follows

$$f(x) = 2x^2 - 5, x \in \mathbb{R}$$

$$g(x) = 3x - 2, x \in \mathbb{R}$$

- a. Evaluate
 - i. $f(-3)$
 - ii. $gf(-3)$
- b. Write an expression for $g^{-1}(x)$
- c. Determine the value of x for which $g^{-1}(x) = 4$
- d. Write an expression for $gf(x)$

14. Jun 95

Given that $f(x) = \frac{1}{2}x$, and $g(x) = x - 2$ calculate

- i. $g(-2)$
- ii. $fg(4)$
- iii. $f^{-1}(4)$

15. Resit 95

Given that $f(x) = 4 - 5x$ and $g(x) = x^2 + 1$, calculate

- i. $f(-2)$
- ii. $gf(-1)$
- iii. $f^{-1}(4)$

16. Jan 96

Given that $h(x) = \frac{x^2 - 16}{x - 2}$, calculate

- i. $h(-2)$
- ii. the value of x for which $h(x) = 0$

17. Jun 96

If $f(x) = 2x - 1$ and $g(x) = \frac{1}{2}(x + 2)$, calculate

- i. $f(3)$
- ii. $g^{-1}(x)$
- iii. $gf(3)$

18. Jan 97

Given that $f(x) = x^2 + 3$, and $g(x) = \frac{x}{2}$, find

- i. the values of $f(3)$, $g(2)$, and $fg(2)$
- ii. expressions for $fg(x)$ and $gf(x)$

19. Jun 97

f and g are functions defined as follows:

$$f : x \rightarrow 3x - 5$$

$$g : x \rightarrow \frac{1}{2}x$$

- a. Calculate the value of $f(-3)$
- b. Write expressions for
 - i. $f^{-1}(x)$
 - ii. $g^{-1}(x)$
- c. Hence, or otherwise, write an expression for $(gf)^{-1}(x)$

20. Jan 98

Given $f(x) = 3x - 2$

- i. Determine $f^{-1}(x)$

- ii. Hence, solve the equation $3x - 2 = 4$

21. Jun 98

Given $f(x) = x^2$ and $g(x) = 5x + 3$, calculate

- i. $f(-2)$
- ii. $gf(-2)$
- iii. $g^{-1}(x)$

22. Jan 99

Given that $f(x) = 2x - 3$

- i. Determine an expression for $f^{-1}(x)$
- ii. Hence, or otherwise, calculate the value of x for which $f(x) = 7$

23. Jun 99

If $h(x) = 1 + 3x$ and $k(x) = x + 2$, calculate

- i. $hk(x)$
- ii. $hk(4)$
- iii. $(hk)^{-1}(x)$
- iv. the value of x when $hk(x) = 0$

24. Jan 00

The function $f : x \rightarrow \frac{1}{2}x - 1$

- i. Find the value of $f(0)$
- ii. Find the value of x for which $f(x) = -5$

25. Jun 00

Given that

$$f : x \rightarrow 3 - x$$

$$g : x \rightarrow \frac{x + 2}{x - 5}$$

- a. Calculate $g(2)$
- b. State the value of x for which $g(x)$ is not defined
- c. Derive an expression for $gf(x)$
- d. Calculate the value of $f^{-1}(4)$

26. Jan 01

Given that $f(x) = x + 2$ and $g(x) = \frac{3}{x}$,

- i. calculate $f(-1)$
- ii. write an expression for $gf(x)$
- iii. calculate the values of x so that $f(x) = g(x)$