

Composite and Inverse Functions

For AQA Level 2 Certificate in Further Mathematics (8365)

Name _____

Total marks: **27**

Answer **all** questions in the spaces provided. Show your working: marks are given for correct method. You may use a calculator.

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

(a) Work out $fg(-1)$

[2 marks]

Answer _____

(b) Solve $f(x) = -17$

[2 marks]

$x =$ _____

2 $f(x) = x^3 + 1$

Circle the expression for $f(2x)$

[1 mark]

$2x^3 + 1$

$2x^3 + 2$

$8x^3 + 1$

$8x^3 + 2$

3 $f(x) = \frac{7-2x}{5}$
Work out $f^{-1}(x)$

[2 marks]

$f^{-1}(x) =$ _____

4 $g(x) = \frac{2x+5}{3x-2} \quad x \neq \frac{2}{3}$
Show that $g^{-1}(x) = g(x)$

[3 marks]

5 $f(x) = (x-3)^2 + 1 \quad \text{for } x \geq 3$
(a) Work out $f^{-1}(x)$

[2 marks]

$f^{-1}(x) =$ _____

(b) Write down the domain of f^{-1}

[1 mark]

Answer _____

- 6** $f(x) = 3x + 2$ and $g(x) = x^2 - 5x$
Solve $fg(x) = 44$

[3 marks]

Answer _____

- 7** $f(x) = x + 4$ and $gf(x) = x^2 + 8x + 19$
Find $g(x)$

[2 marks]

$g(x) =$ _____

- 8** $f(x) = 3x - 1$ and $g(x) = x^2$
Solve $gf(x) = f^{-1}(x)$
Give your answers to 2 decimal places.

[4 marks]

Answer _____

- 9 $f(x) = ax + b$, where a and b are constants and $a > 0$
 $ff(x) = 4x + 9$

(a) Work out the values of a and b .

[3 marks]

$$a = \underline{\hspace{2cm}} \quad b = \underline{\hspace{2cm}}$$

(b) Solve $f(x) = f^{-1}(x)$

[2 marks]

$$x = \underline{\hspace{2cm}}$$