Name: _____

GCSE (1 – 9)

Compound and Inverse Functions

Instructions

• Use **black** ink or ball-point pen.
• Answer all questions.
• Answer the questions in the spaces provided
– *there may be more space than you need.*
• Diagrams are **NOT** accurately drawn, unless otherwise indicated.
• You must **show all your working out.**

Information

• The marks for each question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

• Read each question carefully before you start to answer it.
• Keep an eye on the time.
• Try to answer every question.
• Check your answers if you have time at the end

1. Given that $f(x) = x - 4$ find:

   a) $f(5)$

   .... (1)

   b) $f(3)$

   .... (1)

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2. Given that $g(x) = 2x^2 - 10$ find:

   a) $g(2)$

   .... (1)

   b) $g(-2)$

   .... (1)

   c) $Solve: g(x) = 8$

   .... (3)

3. Given that $f(x) = 3x - 5$ find:

a) $f(3)$

.... (1)

b) $f(-2)$

.... (1)

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

.... (2)

4. Given that $f(x) = x^2 - 3$ find:

a) $f(10)$

.... (1)

b) $f(-1)$

.... (1)

c) *Find*: $f^{-1}(x)$

.... (2)

5. Given that $f(x)=2x-4$ and $g(x)=3x+5$

a) Find: $gf(3)$

.... (2)

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

.... (2)

c) Solve: $f(x)=g(x)$

.... (2)

6.   Given that $f(x) = 3x + 1$ and $g(x) = x^2$

a)   Write down an expression for: $fg(x)$

.... (2)

b)   Work out an expression for: $gf(x)$

.... (2)

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

.... (3)

7. Given that $f(x)=x^2-17$ and $g(x)=x+3$

a) Work out an expression for: $g^{-1}(x)$

.... (2)

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

.... (2)

c) Solve: $f^{-1}(x)=g^{-1}(x)$

.... (4)

8. A function f is defined such that

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

a) Find and expression for : $f(x-2)$

.... (2)

b) Hence solve: $f(x-2) = 0$

.... (2)

9. A function f is defined such that

$$f(x) = 4x - 1$$

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

.... (2)

The function g is such that

$$g(x) = k x^2 \text{ where } k \text{ is a constant}$$

Given that $fg(2) = 12$

b) Work out the value of k

.... (2)

19 For all values of x

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

(a) Show that $gf(x) = 2x(x + 2)$

(b) Find $g^{-1}(7)$