Revision - Functions

1.

The function f is defined as $f(x) = \dfrac{x}{x-1}$.

(a) Find the value of

(i) f(3),

....

(ii) f(−3).

....
(2)

(b) Find ff(x).
Give your answer in its most simple form.

ff(x) = ...

2.

The functions f and g are defined as follows.

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

$$g(x) = \sqrt{x-1}$$

(a) Calculate fg(10)

....

(3)

(b) Express the inverse function g^{-1} in the form $g^{-1}(x) =$ ......

....

(4)

3.

(a) Simplify $\dfrac{x^2-9}{x^2+3x}$

....

(3)

$$f(x) = \frac{x^2 - 9}{x^2 + 3x} \qquad g(x) = \frac{1}{x^2}$$

(b) Use your answer to part (a) to find and simplify $fg(x)$.

$fg(x) =$ ....

(2)

4.

$$f : x \mapsto 2x - 1$$

$$g : x \mapsto \frac{3}{x}, \ x \neq 0$$

(a) Find the value of

(i) $f(3)$,

....

(ii) $fg(6)$.

....

(2)

(b) Express the inverse function f^{-1} in the form $f^{-1}: x \mapsto \ldots$

....

(2)

(c) (i) Express the composite function gf in the form $gf: x \mapsto \ldots$

....

5.

f and g are functions.

$$f: x \mapsto 2x - 3$$
$$g: x \mapsto 1 + \sqrt{x}$$

(a) Calculate f (–4)

....

(2)

(b) Given that $f(a) = 5$, find the value of a.

$a =$ ....

(2)

(c) Calculate gf (6)

....

(2)

(d)

Find the inverse function g^{-1} in the form $g^{-1} : x \mapsto \ldots$

....

(3)

6.

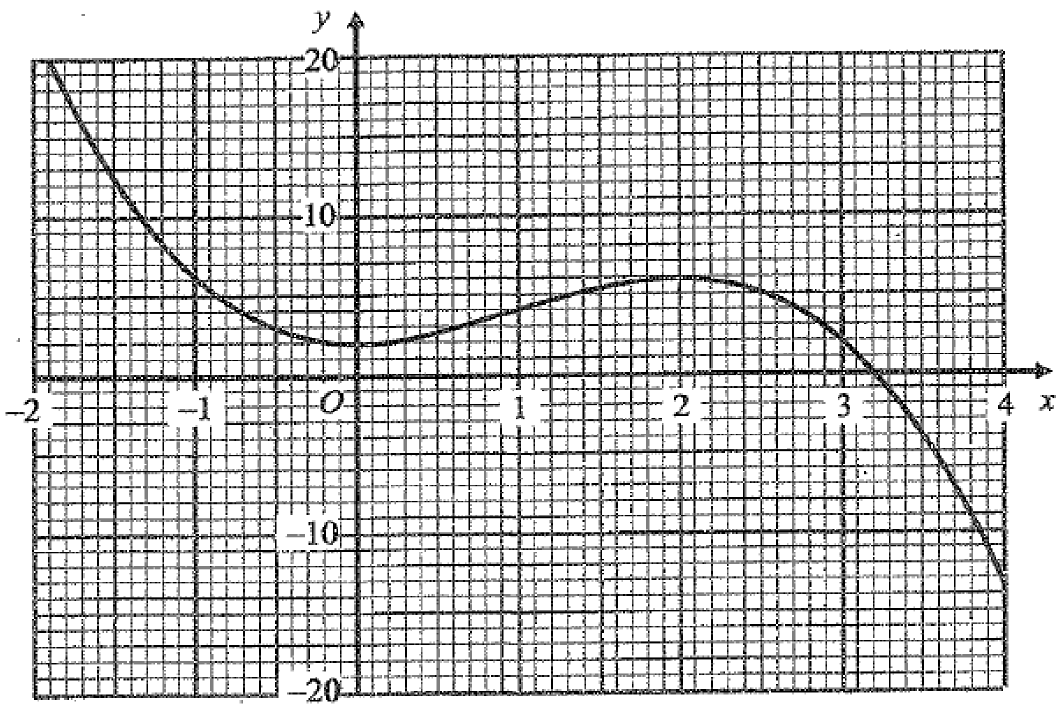
$$f(x) = x^2$$

$$g(x) = x - 6$$

Solve the equation $fg(x) = g^{-1}(x)$

....

7.
The diagram shows part of the graph of $y = f(x)$.



(a) Find f(3).

....

(1)

(b) Solve $f(x) = 6$

....

(2)

(c) Find $ff(1)$.

....

(2)

(d) Find an estimate for the gradient of the curve at the point where $x = -1$

....

(3)

The equation $f(x) = k$, where k is a number, has 3 solutions between $x = -2$ and $x = 4$

(e) Complete the inequalities which k must satisfy.

.... $< k <$ ....

(2)

8.

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

$$g(x) = 2x + 3$$

Solve $fg(x) = f(x)$.

....

9.

$f : x \mapsto 3x + 2$ $\qquad$ $g : x \mapsto 2x - 5$

(a) Express the composite function fg in the form $fg : x \mapsto ...$
Give your answer as simply as possible.

$fg : x \mapsto$ ....
(2)

(b) Express the inverse function f^{-1} in the form $f^{-1} : x \mapsto ...$

$f^{-1} : x \mapsto$ ....
(2)