1.2 Functions

Question Paper

Course	Edexcel IAL Maths: Pure 3
Section	1. Algebra & Functions
Topic	1.2 Functions
Difficulty	Easy

Time allowed: 40

Score: /36

Percentage: /100

Question 1

State whether the following mappings are one-to-one, many-to-one, one-to-many or many-to-many.

(i) $f: x \mapsto 4x - 2$

(ii) $f: x \mapsto x^2$

(iii) $f: x \mapsto \frac{x}{4}$

(iv) $f: x \mapsto \sqrt{x}$

[4 marks]

Question 2

State the largest possible domains for the following functions.

(i) $f: x \mapsto \sqrt{x}$

(ii) $f: x \mapsto \ln(x - 2)$

(iii) $f: x \mapsto \arcsin x$

[3 marks]

Question 3

State the range for the following functions based on the given domains.

(i) $f: x \mapsto e^x$ $x \in \mathbb{R}$

(ii) $f: x \mapsto x^2 + 1$ $x \in \mathbb{R}$

(iii) $f: x \mapsto \dfrac{1}{x}$ $x \in \mathbb{R}$

[3 marks]

Question 4

The function $f(x)$ is defined as

$$f(x) = x^2 - 8x - 20 \qquad\qquad x \in \mathbb{R}$$

(a) Sketch the graph of $y = f(x)$, giving the coordinates of any points where the graph intersects the coordinate axes.

[3 marks]

Question 4

(b) The minimum point on the graph of $y = f(x)$ has x-coordinate 4.
Find the range of f(x).

[2 marks]

Question 5

The functions f(x) and g(x) are defined as follows

$$f(x) = 3x + 5 \qquad x \in \mathbb{R}$$
$$g(x) = -2x \qquad x \in \mathbb{R}$$

(a) Find
(i)   fg(x)
(ii)   gf(x)

[4 marks]

Question 5

(b) Solve the equation f(x) = g(x).

[2 marks]

Question 6

The function $f(x)$ is defined by

$$f(x) = 3x^2 + 1 \qquad\qquad x \in \mathbb{R}$$

(a) Find the inverse of $f(x)$, $f^{-1}(x)$.

[3 marks]

Question 6

(b) Find the domain and range for $f^{-1}(x)$.

[2 marks]

Question 7

(a) Solve the equation $|6 - 2x| = 4$.

[3 marks]

Question 7

(b) On the same diagram, sketch the graphs of $y = |6 - 2x|$ and $y = 4$.
Label the coordinates of the points where the two graphs intersect each other and the coordinate axes.

[4 marks]

Question 7

(c) Consider the graphs of $y = |6 - 2x|$ and $y = k$, where k is a constant.
For which values of k ...
(i) ... will the two graphs have no points of intersection?
(ii) ... will the two graphs have one point of intersection?
(iii) ... will the two graphs have two points of intersection?

[3 marks]