Functions
Difficulty: Hard

Question Paper 1

Level	IGCSE
Subject	Maths (0580/0980)
Exam Board	CIE
Topic	Functions
Paper	Paper 4
Difficulty	Hard
Booklet	Question Paper 1

Time allowed: **84 minutes**

Score: **/73**

Percentage: **/100**

Grade Boundaries:

CIE IGCSE Maths (0580)

A*	A	B	C	D
>83%	67%	51%	41%	31%

CIE IGCSE Maths (0980)

9	8	7	6	5	4
>95%	87%	80%	69%	58%	46%

$f(x) = 2x + 1$ $g(x) = x^2 + 4$ $h(x) = 2^x$

(a) Solve the equation $f(x) = g(1)$. [2]

(b) Find the value of fh(3). [2]

(c) Find $f^{-1}(x)$. [2]

(d) Find $gf(x)$ in its simplest form. [3]

(e) Solve the equation $h^{-1}(x) = 0.5$. [1]

(f) $$\frac{1}{h(x)} = 2^{kx}$$

Write down the value of k. [1]

$f(x) = 5x + 7$ $\quad g(x) = \frac{4}{x - 3}, x \neq 3$

(a) Find

(i) $fg(1)$, [2]

(ii) $gf(x)$, [2]

(iii) $g^{-1}(x)$, [3]

(iv) $f^{-1}f(2)$. [1]

(b) $f(x) = g(x)$

(i) Show that $5x^2 - 8x - 25 = 0$. [3]

(ii) Solve $5x^2 - 8x - 25 = 0$.
Show all your working and give your answers correct to 2 decimal places. [4]

$f(x) = 2x + 5$ $g(x) = 2^x$ $h(x) = 7 - 3x$

(a) Find

(i) f(3), [1]

(ii) gg(3). [2]

(b) Find $f^{-1}(x)$. [2]

(c) Find fh(x), giving your answer in its simplest form. [2]

(d) Find the integer values of x which satisfy this inequality.

$$1 < f(x) \leqslant 9$$

[3]

$f(x) = 1 - 2x$ $\quad$ $g(x) = \frac{1}{x}, x \neq 0$ $\quad$ $h(x) = x^3 + 1$

(a) Find the value of

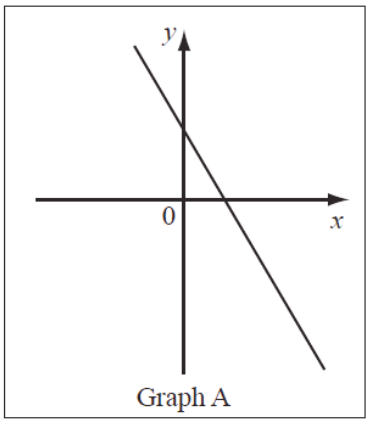
(i) gf(2), [2]

(ii) h(–2). [1]

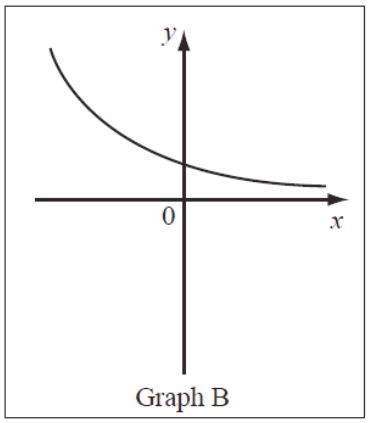
(b) Find fg(x).
Write your answer as a single fraction. [2]

(c) Find $h^{-1}(x)$, the inverse of h(x). [2]

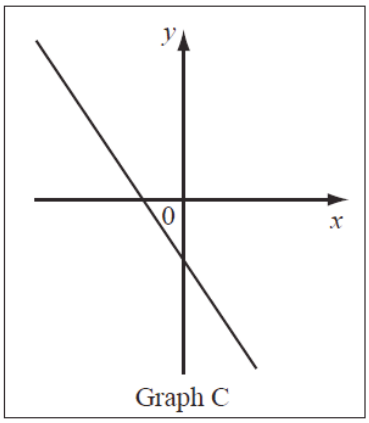
(d) Write down which of these sketches shows the graph of each of $y = f(x)$, $y = g(x)$ and $y = h(x)$.



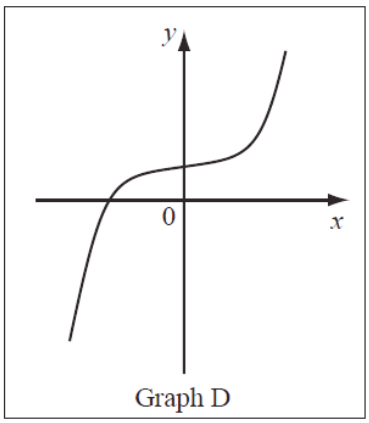
Graph A



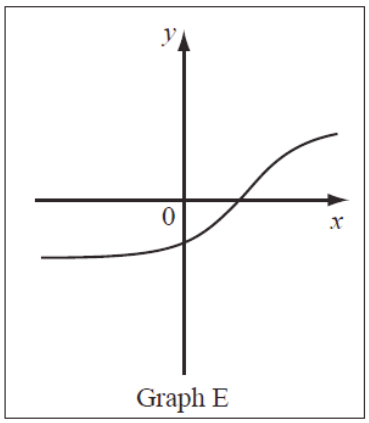
Graph B



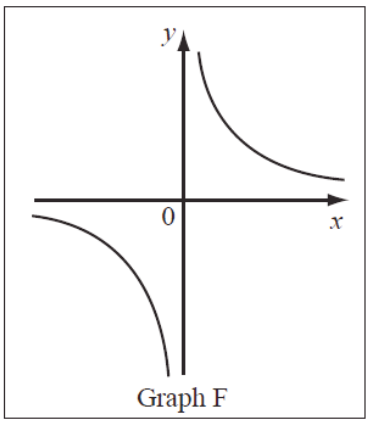
Graph C



Graph D



Graph E



Graph F

[3]

(e) $k(x) = x^5 - 3$

Solve the equation $k^{-1}(x) = 2$. [2]

$$f(x) = 4x - 2$$

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

$$h(x) = x^2 + 3$$

(a) (i) Find the value of hf(2). [2]

(ii) Write fg(x) in its simplest form. [2]

(b) Solve g(x) = 0.2. [2]

(c) Find the value of gg(3). [2]

(d) (i) Show that $f(x) = g(x)$ can be written as $4x^2 - 3x - 2 = 0$. [1]

(ii) Solve the equation $4x^2 - 3x - 2 = 0$.

Show all your working and give your answers correct to 2 decimal places. [4]

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

(a) Find the values of

(i) gf(2), [2]

(ii) ff(0.5). [2]

(b) Find $f^{-1}(x)$, the inverse of $f(x)$. [2]

(c) Find $fg(x)$.

Give your answer in its simplest form. [2]

(d) Solve the equation $x^2 + f(x) = 0$.

Show all your working and give your answers correct to 2 decimal places. [4]