

Name: _____

IGCSE

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

January 2019 Paper 1H Question 19

1 g is the function with domain $x \geq -3$ such that $g(x) = x^2 + 6x$

(a) Write down the range of g^{-1}

$$\underline{g^{-1}(x) \geq -3}$$

(1)

(b) Express the inverse function g^{-1} in the form $g^{-1}: x \rightarrow \dots$

$$g(x) = (x + 3)^2 - 9$$

$$y = (x + 3)^2 - 9$$

$$y + 9 = (x + 3)^2$$

$$\sqrt{y + 9} = x + 3$$

$$(\sqrt{y + 9}) - 3 = x$$

$$g^{-1}(x) = \sqrt{x + 9} - 3$$

$$= -3 + \sqrt{x + 9}$$

$$g^{-1}: x \rightarrow \underline{-3 + \sqrt{x + 9}}$$

(4)

(Total for Question 1 is 5 marks)

June 2019 Paper 2H Question 24

2 The function f is such that $f(x) = 3x - 2$

(a) Find $f(5)$

$$\begin{aligned} f(5) &= 3(5) - 2 \\ &= 13 \end{aligned}$$

13

(1)

The function g is such that $g(x) = 2x^2 - 20x + 9$ where $x \geq 5$

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

$$\begin{aligned} g(x) &= 2(x^2 - 10x) + 9 \\ &= 2[(x-5)^2 - 25] + 9 \\ &= 2(x-5)^2 - 50 + 9 \\ &= 2(x-5)^2 - 41 \end{aligned}$$

$$y = 2(x-5)^2 - 41$$

$$\sqrt{\frac{x+41}{2}} = y-5$$

$$x = 2(y-5)^2 - 41$$

$$5 + \sqrt{\frac{x+41}{2}} = y$$

$$x+41 = 2(y-5)^2$$

$$\frac{x+41}{2} = (y-5)^2$$

$$g^{-1}(x) = 5 + \sqrt{\frac{x+41}{2}}$$

(4)

(Total for Question 2 is 5 marks)

May 2018 Paper 1H Question 14

3 The function f is such that

$$f(x) = \frac{3x-2}{4}$$

(a) Find $f(-7)$

$$f(-7) = \frac{3(-7) - 2}{4}$$

$$\frac{-5.75}{\dots}$$

(1)

(b) Express the inverse function f^{-1} in the form $f^{-1}(x) = \dots$

$$y = \frac{3x-2}{4}$$

$$4y = 3x - 2$$

$$4y + 2 = 3x$$

$$\frac{4y+2}{3} = x$$

$$f^{-1}(x) = \frac{4x+2}{3}$$

$$f^{-1}(x) = \frac{4x+2}{3}$$

(2)

The function g is such that

$$g(x) = \sqrt{19-x}$$

(c) Find $fg(3)$

$$\begin{aligned} g(3) &= \sqrt{19-3} \\ &= \sqrt{16} \\ &= 4 \end{aligned}$$

$$f(4) = \frac{3(4) - 2}{4} = \frac{10}{4} = \frac{5}{2}$$

$$\frac{2.5}{\dots}$$

(2)

(d) Which values cannot be included in any domain of g ?

$$\frac{x > 19}{\dots}$$

(2)

(Total for Question 3 is 7 marks)

Sample Paper 2H Question 17

4 The function f is such that

$$f(x) = \frac{3}{x-2}$$

(a) Find $f(1)$

$$f(1) = \frac{3}{1-2}$$

$$\frac{-3}{\dots\dots\dots}$$

(1)

(b) State which value of x must be excluded from any domain of f

$$\frac{2}{\dots\dots\dots}$$

(1)

The function g is such that $g(x) = x + 4$

(c) Calculate $fg(2)$

$$g(2) = 2 + 4 \\ = 6$$

$$f(6) = \frac{3}{6-2} \\ = \frac{3}{4}$$

$$\frac{\frac{3}{4}}{\dots\dots\dots}$$

(2)

(Total for Question 4 is 4 marks)