5. The function f is defined by

$$f : x \to \frac{2x+16}{x-4} \qquad x \neq 4$$

(a) Find $ff(x)$, giving your answer as a single fraction in its simplest form.

(3)

(b) Find $f^{-1}(12)$

(2)

The function g is defined by

$$g : x \to \ln x \qquad x > 0 \quad x \neq e^4$$

(c) Find the exact values of a such that

$$fg(a) = g(a)$$

(3)

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Question 5 continued

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Question 5 continued

(Total for Question 5 is 8 marks)

6. **In this question you must show all stages of your working.**
Solutions relying entirely on calculator technology are not acceptable.

(a) Show that the equation

$$2\cos(\theta - 60°) = 3\sin\theta$$

can be written in the form

$$\tan\theta = \frac{1}{6}\left(3 + \sqrt{3}\right)$$

(4)

(b) Hence solve, for $0 \leqslant x < 180°$, the equation

$$2\cos(2x - 70°) = 3\sin(2x - 10°)$$

giving your solutions to one decimal place.

(3)

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