4. The resting heart rate, h beats per minute, of a particular group of mammals, can be modelled by the equation

$$\log_{10} h = 2.4 - 0.25 \log_{10} m$$

where m kg is the mass of the mammal.

The mass of one of these mammals is 3 kg.

According to the model,

(a) find the resting heart rate of this mammal. Give your answer to 3 significant figures.

(2)

(b) Show that the equation of the model can be written in the form

$$h = \frac{p}{m^q}$$

giving each of the values of the constants p and q to 3 significant figures where appropriate.

(3)

(c) With reference to the model, interpret the value of the constant p.

(1)

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Question 4 continued

(Total for Question 4 is 6 marks)

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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