Marks

Question 3 (12 marks) Use a SEPARATE writing booklet.

(a) Evaluate $\int_0^1 \frac{dx}{x+4}$. **2**

(b) Assume that the surface area S of a human satisfies the equation **2**

$$S = kM^{\frac{2}{3}}$$

where M is the body mass in kilograms, and k is the constant of proportionality.

A human with body mass 70 kg has surface area 18 600 cm^2.

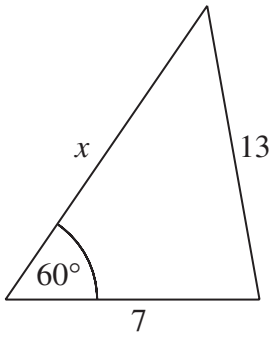
Find the value of k, and hence find the surface area of a human with body mass 60 kg.

(c) Differentiate with respect to x:

(i) $\ln(x^2 - 9)$ **2**

(ii) $\frac{x}{e^x}$. **2**

(d) **4**



NOT TO SCALE

The diagram shows a triangle with sides 7 cm, 13 cm and x cm, and an angle of 60° as marked.

Use the cosine rule to show that $x^2 - 7x = 120$, and hence find the exact value of x.