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

Given that k is a positive constant and

$$\int_k^{2k} \left(\frac{12}{x^2} + 4 \right) \mathrm{d}x = 14$$

find the possible values of k.

(5)

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Question 4 continued

(Total for Question 4 is 5 marks)

5. The circle C_1 has equation

$$x^2 + y^2 - 6x + 5y - 41 = 0$$

(a) Find

(i) the coordinates of the centre of C_1

(ii) the radius of C_1

(3)

The circle C_2 has

- centre $(-k, 0)$ where k is a positive constant
- radius 5

Given that circles C_1 and C_2 touch

(b) find the exact value of k.

(3)

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