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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Question 5 continued

(Total for Question 5 is 6 marks)

6. (i) Given that p and q are consecutive odd numbers, where $p > q > 0$, prove that

$$p^2 - q^2$$

is a multiple of 8

(4)

(ii) The curve C has equation

$$y = x^3 + 12x^2 + 49x + 2$$

Prove that C has no stationary points.

(4)

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