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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Question 6 continued

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Question 6 continued

(Total for Question 6 is 8 marks)

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

(i) Find the exact solution of the equation

$$8^{2x-5} = 20$$

giving the answer in the form $a + b\log_2 5$ where a and b are rational constants.

(4)

(ii) Using the laws of logarithms, solve the equation

$$\log_3(13 + 2y) + 3 = 2\log_3(4 - y)$$

(5)

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