4: (a) Find, in ascending powers of x, the first 4 terms of the binomial expansion of

$$(4 + 5x)^{\frac{1}{2}}$$

giving each term in simplest form.

(5)

(b) State the range of values of x for which this expansion is valid.

(1)

Using the expansion from part (a),

(c) (i) state the first 4 terms of the binomial series expansion of $(4 - 5x)^{\frac{1}{2}}$

(ii) show that, if x is sufficiently small,

$$(4 + 5x)^{\frac{1}{2}} + (4 - 5x)^{\frac{1}{2}} \approx a + bx^2$$

where a and b are constants to be found.

(3)

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Question 4 continued

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Question 4 continued

(Total for Question 4 is 9 marks)

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

A curve C has equation

$$2x + 4y^2 = 6 + 3e^{xy}$$

The point $P\left(\frac{9}{2}, 0\right)$ lies on C.

Find an equation of the tangent to C at P, giving your answer in the form $ax + by + c = 0$ where a, b and c are integers.

(6)

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