4. The curve C has equation

$$y = \frac{2}{x} + 3x - 4 \qquad x \neq 0$$

The straight line l has equation

$$y = kx + 2$$

where k is a constant.

(a) Show that l meets C when

$$(k - 3)x^2 + 6x - 2 = 0$$

(2)

(b) Hence find the value of k for which l is a tangent to C

(3)

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Question 4 continued

(Total for Question 4 is 5 marks)

5. **In this question you must show all stages of your working.**

Solutions relying on calculator technology are not acceptable.

(a) Fully factorise

$$9x^3 - 10x^2 + x$$

(2)

(b) Hence solve

$$9 \times 27^y - 10 \times 9^y + 3^y = 0$$

(3)

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