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

Solutions relying on calculator technology are not acceptable.

$$y = x^3 + 96\sqrt{x} + 5 \qquad x > 0$$

(a) Find $\frac{dy}{dx}$, giving each term in simplest form.

(3)

(b) Find the solution of the equation

$$\frac{d^2y}{dx^2} = 0$$

writing the answer in the form 2^k where k is a constant.

(3)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Question 3 continued

(Total for Question 3 is 6 marks)

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)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA