5. Find

$$\int \frac{4\sqrt{x} - 3}{2x^2} \mathrm{d}x \qquad x > 0$$

writing the answer in its simplest form.

(5)

(Total for Question 5 is 5 marks)

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

The equation

$$k(3x^2 + 8x + 9) = 2 - 6x$$

where k is a real constant, has no real roots.

Find the range of possible values for k.

(7)

(Total for Question 6 is 7 marks)