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

$$f(x) = 3x^3 + ax^2 + bx - 10$$

Given that $(x - 2)$ is a factor of $f(x)$,

(a) use the factor theorem to show that $2a + b = -7$

(2)

Given also that when $f(x)$ is divided by $(x + 1)$ the remainder is -36

(b) find the value of a and the value of b.

(4)

(c) Hence find the quotient and remainder when $f(x)$ is divided by $(x - 5)$

(3)

(Total for Question 4 is 9 marks)

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

Given that k is a constant and

$$\int_2^4 \left(\frac{4}{\sqrt{x}} + k \right) dx = 30$$

find the exact value of k.

(5)

(Total for Question 5 is 5 marks)