5 The polynomial p is such that $\mathrm{p}(x) = 5x^3 + ax^2 + 39x + b$, where a and b are constants.

(a) Given that $x + 3$ is a factor of both $\mathrm{p}(x)$ and $\mathrm{p}'(x)$, find the values of a and b. [5]

(b) Hence solve the equation $\mathrm{p}(x) = 0$.

You must show your working. [3]

(c) Hence, using your values for a and b, solve the equation

$$5\,\text{cosec}^3 2\theta + a\,\text{cosec}^2 2\theta + 39\,\text{cosec}\,2\theta + b = 0 \quad \text{for} \quad 0° \leqslant \theta \leqslant 360°. \qquad [5]$$