3 Find the values of k for which the line $y = x - 3$ intersects the curve $y = k^2x^2 + 5kx + 1$ at two distinct points. [6]

4 The three roots of $\mathrm{p}(x) = 0$, where $\mathrm{p}(x) = 2x^3 + ax^2 + bx + c$ are $x = \frac{1}{2}$, $x = n$ and $x = -n$, where a, b, c and n are integers. The y-intercept of the graph of $y = \mathrm{p}(x)$ is 4. Find $\mathrm{p}(x)$, simplifying your coefficients. [5]

© UCLES 2020