2 The polynomial p is such that $\mathrm{p}(x) = ax^3 + 7x^2 + bx + c$, where a, b and c are integers.

(a) Given that $\mathrm{p}''\left(\frac{1}{2}\right) = 32$, show that $a = 6$. [2]

(b) Given that $\mathrm{p}(x)$ has a factor of $3x - 4$ and a remainder of 7 when divided by $x + 1$, find the values of b and c. [4]

© UCLES 2023

(c) Write $p(x)$ in the form $(3x-4)q(x)$, where $q(x)$ is a quadratic factor. [2]

(d) Hence write $p(x)$ as a product of linear factors with integer coefficients. [1]

© UCLES 2023

[Turn over