2 The polynomial $\mathrm{P}(x)$ is such that $\mathrm{P}(x) = ax^3 - 11x^2 + bx + c$, where a, b and c are integers. $\mathrm{P}(x)$ is divisible by x and has a remainder of $\frac{3}{2}$ when divided by $2x + 1$. It is also given that $\mathrm{P}'(2) = 18$.

(a) Find the values of a, b and c. [6]

(b) Hence write $\mathrm{P}(x)$ as a product of three linear factors. [2]

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3 The point A has position vector $\begin{pmatrix} 2 \\ -6 \end{pmatrix}$. The point B has position vector $\begin{pmatrix} -3 \\ 6 \end{pmatrix}$.

(a) Find, in vector form, the displacement of B from A. [2]

(b) Find the distance AB. [1]

The point X is such that $3\overrightarrow{AB} = 2\overrightarrow{AX}$.

(c) Find the position vector of X. [2]