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

It is given that $\mathrm{p}'(-1) = 21$ and that $x - 2$ is a factor of $\mathrm{p}(x)$.

(a) Find the values of a and b. [4]

(b) Hence write $\mathrm{p}(x)$ as a product of linear factors with integer coefficients. [3]

(c) Using your values of a and b, solve the equation $3\mathrm{e}^{6y} - 7\mathrm{e}^{4y} + a\mathrm{e}^{2y} + b = 0$. [3]

6 When $\ln y$ is plotted against x^3, a straight line passing through the points $(2, 5)$ and $(-8, 25)$ is obtained.

(a) Find y in terms of x. [4]

(b) Find the value of x when $y = e^{25}$. [2]

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