2 Variables x and y are related by the equation $y = x\sqrt{1+2x}$.

(a) Find $\frac{\mathrm{d}y}{\mathrm{d}x}$. [3]

(b) It is given that when $y = 12$, $x = 4$. Find the approximate change in x when y increases from 12 by the small amount 0.06. [3]

(c) Find the x-coordinate of the stationary point on the curve $y = x\sqrt{1+2x}$. [2]

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3 DO NOT USE A CALCULATOR IN THIS QUESTION.

The polynomial p is defined by $\mathrm{p}(x) = ax^3 - 3x^2 - 3x + b$, where a and b are constants.

(a) Given that $x = 2$ and $x = -1$ are roots of the equation $\mathrm{p}(x) = 0$, find a and b. [3]

(b) Solve the equation $\mathrm{p}(x) = 0$. [2]