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6. The curve C has equation

$$y = ax^3 + bx^2 + 12x + 2$$

where a and b are constants.

(a) Find, in terms of a and b,

(i) $\dfrac{dy}{dx}$

(ii) $\dfrac{d^2y}{dx^2}$

(3)

Given that

- the point $P\left(\frac{3}{2}, \frac{13}{2}\right)$ lies on C
- $\dfrac{d^2y}{dx^2} = 0$ at P

(b) find the value of a and the value of b.

(2)

(c) Show that P is a point of inflection.

(2)