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13	12a	The cubic $y = ax^3 + bx^2 + cx + d$ has a point of inflexion at $x = p$. Show that $p = -\dfrac{b}{3a}$.	2

State Mean:
1.61/2

$$y = ax^3 + bx^2 + cx + d$$

$$y' = 3ax^2 + 2bx + c$$

$$y'' = 6ax + 2b$$

$$y''(p) = 6ap + 2b = 0$$

$$6ap = -2b$$

$$p = \frac{-2b}{6a}$$

$$= \frac{-b}{3a}$$

* These solutions have been provided by *projectmaths* and are not supplied or endorsed by the Board of Studies

Board of Studies: Notes from the Marking Centre

This question was generally well done, with most candidates recognising that they were required to solve $f'(p) = 0$ for the point of inflexion.

Common problems were:

- finding $f(p)$ before differentiating
- differentiating y or y' incorrectly.

Source: http://www.boardofstudies.nsw.edu.au/hsc_exams/