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2014   11c   Differentiate $\dfrac{x^3}{x+1}$.

2

Using the quotient rule,

Let $u = x^3$, $u' = 3x^2$

Let $v = x + 1$, $v' = 1$

$$\frac{dy}{dx} = \frac{vu' - uv'}{v^2}$$

$$= \frac{(x+1).3x^2 - x^3.1}{(x+1)^2}$$

$$= \frac{3x^3 + 3x^2 - x^3}{(x+1)^2}$$

$$= \frac{2x^3 + 3x^2}{(x+1)^2}$$

$$= \frac{x^2(2x+3)}{(x+1)^2}$$

State Mean:
1.67

* These solutions have been provided by *projectmaths* and are not supplied or endorsed by BOSTES.

Board of Studies: Notes from the Marking Centre

This part was generally done well with most candidates correctly using the quotient rule. The use of the product rule was less successful as often errors were made in manipulating indices.

Common problems were:

- using an incorrect formula for example $\dfrac{uv' \pm vu'}{v^2}$

- using incorrect derivatives of u and v.

http://www.boardofstudies.nsw.edu.au/hsc_exams/2014/pdf_doc/2014-maths.pdf