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<b>11</b>	<b>4a</b>	Differentiate $\frac{x}{\sin x}$ with respect to $x$ .	<b>2</b>
<p>Let <math>y = \frac{x}{\sin x}</math>.</p> <p>Using the quotient rule,</p> <p>Let <math>u = x</math>, <math>u' = 1</math></p> <p>Let <math>v = \sin x</math>, <math>v' = \cos x</math></p> $\frac{dy}{dx} = \frac{v \cdot u' - u \cdot v'}{v^2}$ $= \frac{\sin x \cdot 1 - x \cdot \cos x}{\sin^2 x}$ $= \frac{\sin x - x \cos x}{\sin^2 x}$			<p>State Mean:</p> <p><b>1.65/2</b></p>

\* 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 done well, with most candidates recognising that they were required to use the quotient rule. Many were assisted by writing  $u$ ,  $u'$ ,  $v$  and  $v'$ . A small number quoted the quotient rule incorrectly. Some also differentiated  $\sin x$  incorrectly to arrive at  $-\cos x$ . Responses in which the product rule was used to differentiate  $x(\sin x)^{-1}$  were rarely fully successful, the most common error being an incorrect differentiation of  $(\sin x)^{-1}$ .

Source: [http://www.boardofstudies.nsw.edu.au/hsc\\_exams/](http://www.boardofstudies.nsw.edu.au/hsc_exams/)