10	2a	Differentiate $\frac{\cos x}{x}$ with respect to x.	2

State Mean: **1.65/2**

Let $y = \frac{\cos x}{x}$.

Using the quotient rule,

Let $u = \cos x$, $u' = -\sin x$

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

$$\frac{dy}{dx} = \frac{v.u' - u.v'}{v^2}$$

$$= \frac{x.(-\sin x) - \cos x.1}{x^2}$$

$$= \frac{-x\sin x - \cos x}{x^2}$$

* 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

Many candidates were assisted by using writing u, u', v, and v' first and then proceeding with their working. Mistakes were occasionally made with signs in the numerator and a small number used $\cos 2x$ as the denominator. A significant number did not know the quotient rule. Two areas of concern were the incorrect simplification of $x\sin x$ to $\sin x^2$ and cancelling the x in the numerator with an x in the denominator. Some candidates applied the product rule to the expression $x^{-1}\cos x$, but they were no more successful than those who applied the quotient rule directly.

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