2014 14a Find the coordinates of the stationary point on the graph $y = e^x - ex$ and determine its nature. **3**

$y = e^x - ex$

$\frac{dy}{dx} = e^x - e = 0$

$e^x = e$

$x = 1$

$y(1) = e^1 - e(1)$

$= 0$ $\therefore$ stat pt at (1, 0)

$\frac{d^2y}{dx^2} = e^x$

$\frac{d^2y}{dx^2}(1) = e^1 > 0$ $\therefore$ minimum

$\therefore$ minimum at (1, 0)

State Mean: **2.02**

Board of Studies: Notes from the Marking Centre

This part was generally well attempted with most candidates finding a stationary point. The first derivative test was a more popular test for the nature of the point. Candidates are encouraged to use calculators to check values when testing for positive, negative and zero gradients.

Common problems were:

- using the product rule on the function ex and treating *e* as a function, rather than a constant;
- omitting the test to determine the nature;
- only finding the *x* coordinate and not the *y* coordinate.

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