11	**7a**	Let $f(x) = x^3 - 3x + 2$. (i) Find the coordinates of the stationary points of $y = f(x)$, and determine their nature. (ii) Hence, sketch the graph $y = f(x)$ showing all stationary points and the y-intercept.	**3** **2**

(i) $f(x) = x^3 - 3x + 2$

$f'(x) = 3x^2 - 3 = 0$

$3x^2 = 3$

$x = \pm 1$

$f(1) = (1)^3 - 3(1) + 2 = 0$

$f(-1) = (-1)^3 - 3(-1) + 2 = 4$

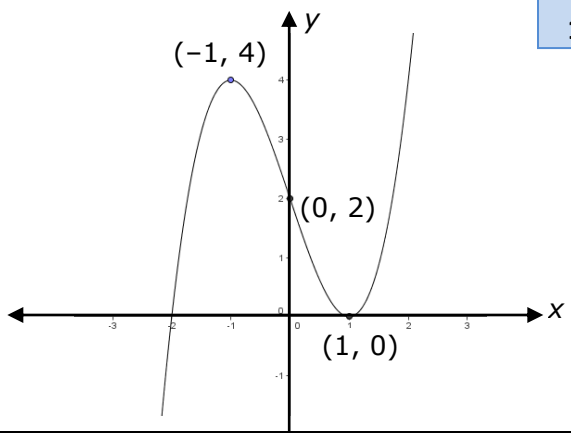
Stat points at (1, 0) and (−1, 4)

$f''(x) = 6x$

$f''(1) = 6(1) = 6 \quad \therefore$ min (1, 0)

$f''(-1) = 6(-1) = -6 \therefore$ max (−1, 4)

(ii) y-intercept of 2



State Mean:
2.48/3
1.63/2

* 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

This part was generally done well. Transcription errors were common, for example $x^2 - 3x + 2$, $x^3 - 3x^2 + 2$ and $x^3 + 3x + 2$. Such errors may result in the necessary skills not being demonstrated.

(i) Most candidates attempted to solve $f'(x) = 0$, with a significant number giving $x = 1$ or $x = 0, 1$ or $x = 0, 1, -1$ or $x = \sqrt{3}, \sqrt{-3}$. Many candidates used tables of values that were not labelled adequately, if at all. Numerical errors made tables difficult to interpret and points impossible to graph meaningfully.

(ii) The better responses used the results from (i) to produce a neat, well-labelled sketch that clearly showed the y-intercept and other important points. A number of candidates plotted points from a table of values and did not use answers to part (i).

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