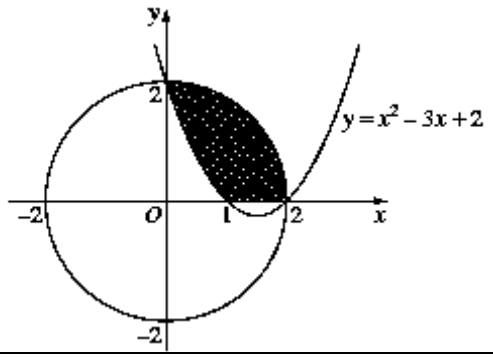
05	8b	The shaded region in the diagram is bounded by the circle of radius 2 centred at the origin, the parabola $y = x^2 - 3x + 2$, and the x-axis. By considering the difference of two areas, find the area of the shaded region.		3

Area = Area of quadrant with radius 2 units **minus** area under $y = x^2 - 3x + 2$, from $x = 0$ to $x = 1$

$$= \frac{1}{4} \times \pi \times 2^2 - \int_0^1 x^2 - 3x + 2 \; dx$$

$$= \pi - \left[\frac{x^3}{3} - \frac{3x^2}{2} + 2x \right]_0^1$$

$$= \pi - \left[\frac{1}{3} - \frac{3}{2} + 2 - 0 \right]$$

$$= \pi - \frac{5}{6}$$

$\therefore$ area of $(\pi - \frac{5}{6})$ unit^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

Better responses to this part recognised that the area of a quadrant of a circle could be found by using the formula for the area of a circle. Common errors in this part were made in writing the equation of the circle, for example $y = \sqrt{4 - x^2} = 2 - x$, and determining an integral expression that represented the shaded region.

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