09	4b	Find the values of k for which the quadratic equation $x^2 - (k + 4)x + (k + 7) = 0$ has equal roots.	3

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$x^2 - (k + 4)x + (k + 7) = 0$

$$\begin{aligned}\Delta &= b^2 - 4ac = 0\\ &= (k + 4)^2 - 4(1)(k + 7)\\ &= k^2 + 8k + 16 - 4k - 28\\ &= k^2 + 4k - 12\end{aligned}$$

As $\Delta = 0$ when equal roots: $k^2 + 4k - 12 = 0$

$$(k + 6)(k - 2) = 0$$

$$k = -6 \text{ and } 2$$

Board of Studies: Notes from the Marking Centre

Most candidates realised that using the discriminant was a way to answer this part. Most candidates substituted into the equation of the discriminant but a significant number of these were then let down by poor basic algebra skills. In a small number of responses, candidates did not make the discriminant equal zero and so could not achieve full marks. Candidates who opted to use an alternative solution were often successful, with the relation between roots and coefficients being the most popular alternative.

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