

STEP III, 2015 , Q5 EC

5. Marginally less successful than question 2, a lot of candidates earned about half of the marks. Unfortunately, many candidates approached this on the basis of their knowledge of the standard irrationality proof for root two employing rational numbers expressed in lowest terms rather than observing the specified argument. In part (i), proving step 5 was frequently beset with omissions, and simple steps like $0 < \sqrt{2} - 1 < 1$ were not acknowledged let alone justified. The first result of part (ii) caused few problems except to those that did not appreciate 'if and only if', but defining a suitable set in order to construct a similar argument to prove the irrationality of the cube roots of 2 and 2 squared was beyond most leading to mostly spurious logic.



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