



STEP II, 2008, Q6 EC

Q6 This was the least popular of the pure maths questions. Although there were 300 starts to the question, most of these barely got into the very opening part before the attempt was abandoned in favour of another question. Most attempts failed to show that $f(x)$ has a period of 4π . As mentioned, few proceeded further. Of those who did, efforts were generally very poor indeed – as testified to by the very low mean mark of 4 – with the necessary comfort in handling even the most basic of trig. identities being very conspicuous by its absence. Part (iii) was my personal favourite amongst the pure questions, as it contained a very uncommon – yet remarkably simple – idea in order to get started on the road to a solution. The idea is simply this: $f(x)$, being the sum of a cosine term and sine term, is equal to 2 *if and only if* each of these separate terms is simultaneously at its maximum of 1. That is, the question is actually two very easy trig. equations disguised as one very complicated-looking one. Once realised, the whole thing becomes very straightforward indeed, but only a few candidates had persevered this far.



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