

STEP II, 2022, Q4 EC

Question 4

Almost all candidates attempted this question, and many of these did so very successfully. The majority of attempts managed to make some good progress, especially in the first three parts.

Overall, the way in which each of the given modulus forms changed sign was generally well grasped, although explanations were often rather lacking in detail. The graphs to be drawn in parts (i) and (iii) were managed well overall, although in some cases the fact that horizontal lines were drawn along the horizontal lines of the answer booklet meant that the intention was not always clear on the scanned script.

In part (i) some candidates failed to give sufficient explanation to show that the single formula could be written as the given set of three equations. Although a small number of candidates omitted to sketch the graph, most were able to draw the correct three straight line segments.

Part (ii) was well attempted, and many candidates were able to identify that the new function was very closely related to the one in the first part of the question meaning that they were able to write down the correct formula. Those who wrote a general form were almost always able to follow through the process to reach the correct final answer.

The introduction of quadratic terms to the function did not cause too much difficulty for candidates and many were able to deduce the correct equations for the sections of the function in part (iii). While many correctly identified the shape of the two quadratic sections, in several cases the graphs presented were symmetric.

Part (iv) presented more of a challenge, but many candidates who wrote down a general form were able to work through to achieve the correct final answer. A few candidates were able to write down the answer, but in some cases their answer was not verified even though the question explicitly asked for verification that the formula is correct.



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