

STEP II, 2021, Q3 EC

Question 3

This was a popular question, attempted by a large proportion of the candidates. Candidates who were able to appreciate the method by which the integer and fractional parts could be interpreted to find the original values were able to make good progress and gain high marks with relatively short solutions. Those who did not see this could produce many pages of work without making significant progress towards a solution.

In part (i) candidates were often able to deduce the values of x and y successfully, but some did not remember that the fractional part was defined as positive in the explanation at the start of the question, meaning that they found options for the final answer.

A variety of successful methods were seen for part (ii) and there were a high proportion of perfect answers. The most successful approach was to combine the simultaneous equations to reach the given two-variable equation. Another method was to analyse the set of 8 different cases to identify the unique solution. The most common problem encountered with this approach was to fail to identify all of the possible cases.

Part (iii) was found to be difficult by many of the candidates. While many were able to find the “obvious” solution of halving the value from (ii), the complication presented by the coefficient of 2 was not appreciated by all. Those who did were often then able to earn most of the marks for this part.



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