

STEP II, 2013, Q5 EC

5. This was one of the more successfully attempted questions on the paper and the Pure Mathematics question with the highest average mark. While some candidates struggled with the application of the chain rule throughout this question, many were able to complete the first part of the question without much difficulty. Showing that f satisfied the required conditions in part (i) was generally well done, but the sketching of the graph was found to be more difficult, with a number of

candidates not identifying the asymptotes and some thinking that part of the graph would drop below the x -axis. Most of the candidates who attempted part (iii) found the roots of the equation successfully, but a large number forgot to exclude the roots when solving the inequality. In the final part, many identified $x=3$ as a solution, but those who split the fraction into two equations (one for the numerator equalling 343 and one for the denominator equalling 36) did not check that the solution worked for both parts. Those who used the symmetries established in part (i) were then able to identify the other roots easily, while those who attempted algebraic solutions for the other roots were generally not successful.



NextStepMaths.com

To view mark schemes, fully worked solutions and examiner's comments, and for more details about tutoring and other services offered, go to [NextStepMaths.com](https://www.NextStepMaths.com)