

STEP II, 2021, Q5 EC

Question 5

This proved to be a popular question. In part (i), many candidates were able to use the substitution to reduce the differential equation into a form where the variables could be separated, but a surprising number struggled with the integral that resulted from this process. A variety of approaches were successfully employed by those who were able to complete the integration, but candidates often forgot the modulus function inside the logarithm, which caused problems later in the question. A small number of candidates forgot that the constant of integration would also be multiplied by $(x - a)$ in the final step of this part of the question.

In part (ii) some candidates were unsure how to use the information given about the tangent. Those who set $a = 1$ were generally able to make good progress and many correct sketches were produced. A number of candidates assumed, without justification, that the form of $f(x)$ would remain unchanged from part (a) to part (b).



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)