STEP II, 2019, Q6 EC

Of the Pure questions, this was the question that had the lowest average mark, mainly due to the large number of attempts that did not manage to score any marks.

Many candidates seemed uncomfortable with this question which asked them to look at what information can be gleaned about differential equations without directly solving them. Many candidates decided that the only way to proceed was to solve the differential equation, and almost invariably this led to long and convoluted methods. Candidates seemed to have very little idea that the differential equation can be interpreted as the gradient of a curve at different points – it was simply an object on which certain methods had to be applied. A surprisingly small number of candidates realised that setting $\frac{dy}{dx} = 0$ could (and should) be done directly in the differential equation to find the locus of stationary points.

This was also a question which required candidates to bring a lot of disparate information together in the final sketches. A large number of candidates said things like the gradient was negative between two lines, but their sketch showed something different. Some who said that there should be stationary points on the line $y = x - 1$ and $y = x - 3$ drew their curve tangentially to these two lines instead.

Overall this was a question which really benefitted candidates who took a moment to stop and think about what was being suggested, rather than blindly applying methods.