

STEP III, 2023, Q1 EC

Question 1

Although this was a very popular question, being attempted by nearly 93% of the candidature, it was very narrowly beaten into second place by question 5. It was the third most successfully attempted with a mean score of approximately 9.5/20.

Most candidates found the equation of the line, and of the circle and then solved simultaneously in part (i) to find common points, rather than using the perpendicular distance from a line formula; some using the distance formula misquoted it, with a common error being failure to include the modulus signs. Then they generally applied use of the discriminant, but with varying success.

In part (ii), most candidates successfully expressed the given expression as a quadratic in q , obtained the determinant and the two required expressions using Vieta's formulas, but failed to fully demonstrate the inequality.

Attempts at part (iii) were frequently inelegant and involved repeating work from previous parts of the question, rather than using the results of part (i) and (ii).



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)