

STEP III, 2024, Q4 EC

Question 4

The fourth most popular question, it was the third most successful, with a mean score of 10 marks.

Part (i) needed more thoroughness than many attempts displayed. Most sensibly chose to express the gradients as tangents of angles of the lines to the x -axis, but then did not define these or consider the possible cases that could arise such as which was greater, or state that the difference between the angles is $\pm 45^\circ$ or $45^\circ/135^\circ$. As the result was given in the question, there was an expectation that there should be complete justification.

In part (ii), most attempts at the coordinates of the point of intersection were successful, though many did not use the non-equality of p and q , and a large number got the y coordinate wrong through substituting x into the equation of the parabola. Overall, many did well with the final result of this part, employing the various results from earlier in the part and that of (i).

Part (iii) proved challenging for most, and there was a fair amount of guesswork based on the knowledge that 30° , 45° and 60° are angles with nice trigonometric values!



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