

STEP II, 2014, Q3 EC

Question 3

Many candidates produced a correct solution to the first part of the question. There were a number of popular methods, such as the use of similar triangles, but an algebraic approach finding the intersection between the line and a perpendicular line through the origin was the most popular. Some candidates however, simply stated a formula for the shortest distance from a point to a line. Establishing the differential equation in the second part of the question was generally done well, but many candidates struggled with the solution of the differential equation. A common error was to ignore the case $y'' = 0$ and simply find the circle solution.

The final part of the question was attempted by only a few of the candidates, many of whom did not produce an example that satisfied all of the conditions stated in the question, in particular the condition that the tangents should not be vertical at any point was often missed.



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