

STEP III, 2018, Q4 EC

Question 4

The third most popular question being attempted by just short of three quarters of the candidature, it was however the most successfully attempted with a mean score of not quite 12/20. The stem was usually correctly attempted either using parametric or implicit differentiation. Simultaneous equations were sensibly attempted for part (i), but sometimes they confused the two pairs of equations and as a result got the wrong answer. Some solutions elegantly achieved the correct result having found just one of the coordinates and arguing that as it lay on the tangent, it had to be the point P. Part (ii) was quite often abandoned partway through, giving up after obtaining x^2 and y^2 in the face of the algebra, although some forgot to answer the question at this point even though they had employed simultaneous equations to obtain x and y . Few managed to conclude the question, and it was very rare indeed that the non-zero nature of the denominator ($\sin \varphi - \sin \theta$) was justified.



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