

## STEP II, 2006, Q7 EC

- 7 This proved to be a relatively popular choice of question, usually being pretty well-done, at least up to the point where trig. identities came into play, and often all the way through. It is suspected that the principal reasons for this were that the question had a fairly routine start, and then developed in a fairly straightforward A-level manner thereafter.

Most attempts established the opening result easily enough, and also managed to acquire  $Q$ 's coordinates without much difficulty, and usually the equation of the line  $PQ$  also. A common shortfall at the next stage was not so much the introduction of the trig., which clearly put some candidates off, but rather the use of the trig. to show that the two lines were the same when these identities were used. A very surprising number of candidates seemed content to suggest that the two forms of the line were the same **on the basis of their gradients only**.

Those who got as far as the last part usually handled it very capably, showing that the two cases led to  $PQ$  being the vertical and horizontal tangents (respectively) to the ellipse.



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