

## STEP III, 2017, Q7 EC

### Question 7

With popularity between that of questions 4 and 5, the mean score was about 8/20, making it one of the least successful pure questions. Most candidates attempting this question did the stem correctly and then scored about half the marks on (i) before stopping, either due to mistakes in the gradient computation or commonly not identifying the  $(1 + t^2)^2$  in the constant term of the line equation. A common slip was to differentiate  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

implicitly as  $\frac{2x}{a^2} + \frac{2y \frac{dy}{dx}}{b^2} = 1$ . The geometric interpretation in (i) was frequently omitted, and there were numerous and varied incorrect suggestions for the case  $X^2 = a^2$ . Few continued to (ii), though it should be observed that some courted disaster by labelling the coefficients of the quadratic in (i) as  $a$ ,  $b$ , and  $c$ .



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