STEP III, 2005, Q2 EC

2 This question was attempted by almost all candidates and most managed the early parts successfully, though many used the expression $2+2(y')^2+2yy''$ for the second derivative of x^2+y^2, which made this part much harder than necessary. Very few than achieved full marks for determining the closest points to the origin on the curve, noticing correctly the existence or otherwise of two turning points of x^2+y^2 other than at $x = 0$, and showing clearly which points were minima, under the two conditions on a and c.