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8. An ellipse has equation

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \qquad a > 0,\ b > 0$$

The line l has equation $y = mx + c$ where $m < 0$ and $c > 0$

Given that l is a tangent to the ellipse,

(a) show that $c^2 = b^2 + a^2m^2$

(4)

The tangent l meets the positive x-axis at the point A and the positive y-axis at the point B. The origin is O.

Given that m varies,

(b) show that the minimum area of triangle OAB is ab.

(7)

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