

Subtangent and Subnormal.

Let the tangent and normal at $P(x_1, y_1)$ meet the x-axis at A and B respectively.

Length of sub tangent at $P(x_1, y_1)$ to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is $DA = CA - CD = \frac{a^2}{x_1} - x_1$

Length of sub-normal at $P(x_1, y_1)$ to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is

$$BD = CD - CB = x_1 - \left(x_1 - \frac{b^2}{a^2} x_1 \right) = \frac{b^2}{a^2} x_1 = (1 - e^2) x_1.$$

