GEOMETRICAL AND PHYSICAL APPLICATIONS

The following results will often be used to solve problems having geometrical flavour.
For the curve $y = f(x)$ or $f(x, y) = 0$

i. Slope of tangent to the curve at (x, y) is $\frac{dy}{dx}$.

ii. Slope of normal to the curve at (x, y) is $-\frac{dx}{dy} = -\frac{1}{(\frac{dy}{dx})}$.

iii. The equation of tangent to the curve at (x, y) is $Y - y = \frac{dy}{dx}(X - x)X, Y$ being the current co-ordinates

iv. The equation of the normal to the curve at (x, y) is $(X - x) + \frac{dy}{dx}(Y - y) = 0$

v. The intercepts of the tangent on the x-axis and y-axis are $x - y\frac{dx}{dy}$ and $y - x\frac{dy}{dx}$ respectively.

vi. The lengths of tangent and normal are respectively $y\sqrt{1 + \left(\frac{dx}{dy}\right)^2}$ and $y\sqrt{1 + \left(\frac{dy}{dx}\right)^2}$

vii. The lengths of sub-tangent and sub-normal are respectively $y\frac{dx}{dy}$ and $y\frac{dy}{dx}$