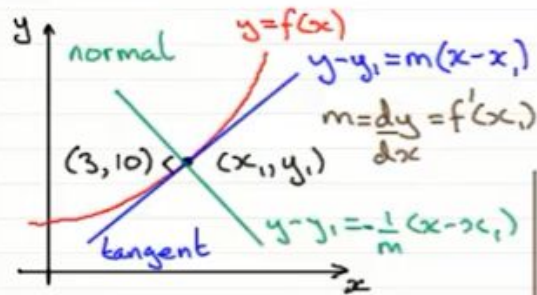




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How to Find Equations of Tangents and Normals



$$y = x^2 + 1, \quad \therefore \frac{dy}{dx} = 2x$$

$$\text{when } x = 3, \quad y = 3^2 + 1 = 10$$

$$\text{and } \frac{dy}{dx} = 2(3) = 6$$

$$\therefore \text{gradient of tangent} = 6$$

$$\therefore \text{gradient of normal} = -\frac{1}{6}$$

Find the equation of the tangent and normal to the curve $y = x^2 + 1$ at the point where $x = 3$.

\therefore Equation of tangent at $(3, 10)$ is

$$y - 10 = 6(x - 3)$$

$$\therefore y = 6x - 8$$

Equation of normal at $(3, 10)$ is

$$y - 10 = -\frac{1}{6}(x - 3)$$

$$\therefore 6y - 60 = -x + 3$$

$$\therefore x + 6y - 63 = 0$$

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