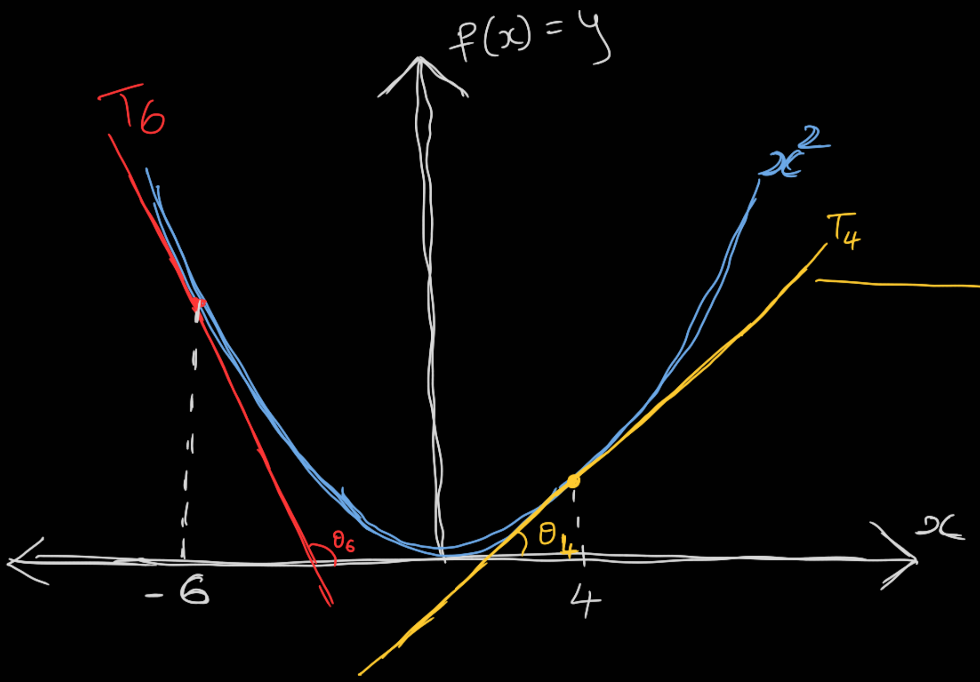
Geomentric intuition of Derivative :

There are many ways to think and understand Derivative first lets see at the geometric way



→ Tangent at $x=4$

↳ Touches $f(x)$ only @ one-point

Now, we can define derivative as

$$\left.\frac{df(x)}{dx}\right|_{x=4} = \text{Slope of } T_4$$

$$\text{Slope of } T_4 = \tan(\theta_4)$$

at origin $x=0$ and $\theta_0 = 0$

so, $\left.\frac{df(x)}{dx}\right|_{x=0}$ = slope of tangent at 0

$= \tan(\theta_0) = \underline{\underline{0}}$

and for $x=6$ we have

$$\left.\frac{df(x)}{d(x)}\right|_{x=6} = \text{slope of } T_6 = \tan(\theta_6)$$

$\theta_4 = 0 - 90^\circ$ → +ve slope, underlying function is ↑

$\theta_0 = 0^\circ$ → Slope = 0 ⇒ $f(x)$ is constant (neither ↑ nor ↓)

$\theta_6 = 90^\circ - 180^\circ$ → −ve slope, underlying function is ↓