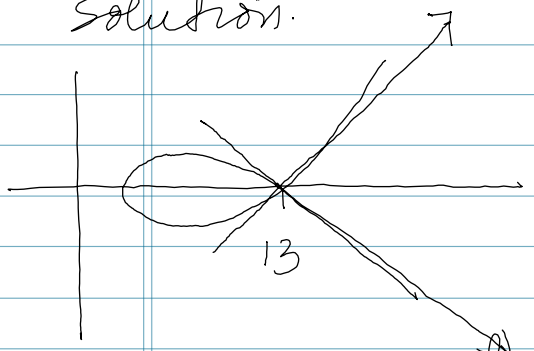
Example Find the equations of the tangent lines to the curve $x = 3t^2+1$, $y = 4t^3 - t^5$, at $(13, 0)$

Solution:




$x = 3t^2+1 = 13$, $y = 4t^3 - t^5 = 0$

$3t^2 = 12$ $\quad t^3(4-t^2) = 0$

$t^2 = 4$ $\quad t = 0, t = \pm 2.$

$t = \pm 2$

$$\frac{dy}{dx} = \frac{\frac{dy}{dt}}{\frac{dx}{dt}} = \frac{12t^2 - 5t^4}{6t}$$

$$t = -2, \quad \frac{dy}{dx} = \frac{12(-2)^2 - 5(-2)^4}{6(-2)} = \frac{8}{3}$$

$$t = 2, \quad \frac{dy}{dx} = \frac{12(2)^2 - 5(2)^4}{6(2)} = -\frac{8}{3}$$

(1) $y = \frac{8}{3}(x-13)$

(2) $y = -\frac{8}{3}(x-13)$