$y + y - \frac{3x}{2} + \frac{1}{2} - \frac{3}{2} = 0$

$y - \frac{3x}{2} - \frac{2}{2} = 0$

$y - \frac{3x}{2} - 1 = 0$

$2y - 3x - 2 = 0$ Equation of the tangent

$y - y_1 = \frac{-1}{m}(x - x_1)$

$y + \frac{1}{2} = \frac{-1}{\frac{3}{2}}(x + 1)$

$y + \frac{1}{2} = \frac{-2}{3}(x + 1)$

$y + \frac{1}{2} = \frac{-2x}{3} + \frac{2}{3}$

$y + \frac{2x}{3} + \frac{1}{6} = 0$

$6y + 4x + 7 = 0$ Equation of the normal

4) $y = 1 + x - x^2$ at the point $(-2, -5)$

$\frac{dy}{dx} = 1 - 2x$

$\frac{dy}{dx}\Big|_{x=-2} \quad 1 - 2(-2)$

$m = 5$

$y - y_1 = m(x - x_1)$

$y + 5 = 5(x + 2)$

$y + 5 = 5x + 10$

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$y = 2x^2$ at Point $(1, 2)$

Solution

$\frac{dy}{dx} = 4x$ $y_1 = 2$, $x_1 = 1$

$\frac{dy}{dx}\Big|_{x=1} = 4$

$m = 4$

$y - y_1 = m(x - x_1)$

$y - 2 = 4(x - 1)$

$y - 2 = 4x - 4$

$y = 4x + 2$ Equation of the tangent

Equation of the Normal

$y - y_1 = m(x - x_1)$

$m_1 m_2 = -1$

$y - y_1 = \frac{-1}{m}(x - x_1)$

$y - 2 = \frac{-1}{4}(x - 1)$

$\frac{dx}{dy}\Big|_{x=3}$

$y - y_1 = m(x - x_1)$

$y - \frac{1}{3} = -\frac{1}{9}(x - 3)$

$y - \frac{1}{3} = \frac{-x}{9} + \frac{1}{3}$

$y + \frac{x}{9} - \frac{1}{3} - \frac{1}{3} = 0$

$y + \frac{x}{9} - \frac{2}{3} = 0$

$9y + x - 6 = 0$ Equation of the tangent

$y - y_1 = \frac{-1}{m}(x - x_1)$

$y - \frac{1}{3} = \frac{-1}{\frac{-1}{9}}(x - 3)$

$y - \frac{1}{3} = 9(x - 3)$

$y - \frac{1}{3} = 9x - 27$

~~$y = 9x - 3y - 1 =$~~

$3y - 1 = 27x - 81$

$3y - 27x + 80$ Equation of the normal

$$y+5 = \frac{-1}{5}(x+2)$$

$5y + 25 = -x - 2$

$5y + x + 27 = 0$ equation of the normal

$y = \frac{1}{x}$ at the point $(3, \frac{1}{3})$

Solution

$$\frac{dy}{dx} = \frac{-1}{x^2}$$

$$\left.\frac{dy}{dx}\right|_{x=3}$$

$m = \frac{1}{}$

2 $y = 3x^2 - 2x$ at the point $(2, 8)$

$\frac{dy}{dx} = 6x - 2$ $x_1 = 2$ $y_1 = 8$

$\frac{dy}{dx}\Big|_{x=2}$ $6(2) - 2$

$= 10$ $m = 10$

$y - y_1 = m(x - x_1)$

$y - 8 = 10(x - 2)$

$y - 8 = 10x - 20$

$y - 10x + 12 = 0$ Equation of the tangent

Equation of the normal

$y - y_1 = -\frac{1}{m}(x - x_1)$

$y - 8 = \frac{-1}{10}(x - 2)$

$10y - 80 = -x - 2$

$10y + x - 78 = 0$

3 $y = \frac{x^{3+1}}{2x}$ at the point $(-1, -\frac{1}{2})$

$\frac{dy}{dx} = \frac{3x^2}{2}$ (used quotient rule)

$\frac{dy}{dx}\Big|_{x=-1}$ $\frac{3(-1)^2}{2}$ $m = \frac{3}{2}$

$y - y_1 = m(x - x_1)$

$y + \frac{1}{2} = \frac{3}{2}(x + 1)$

$y + \frac{1}{2} = \frac{3x}{2} + \frac{3}{2}$