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

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

$5(y + 5) = -1(x + 2)$

$5y + 25 = -x - 2$

$5y + 25 + x + 2 = 0$

$5y + x + 27 = 0$

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

$y = x^{-1}$

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

$m = \frac{-1}{(3)^2} = \frac{-1}{9}$

equation of the tangent

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

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

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

$9y - 3 = -x + 3$

$9y - 3 + x - 3 = 0$

$9y + x - 6 = 0$

equation of the normal

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

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

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

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

$y - \frac{1}{3} - 9x + 27 = 0$

$y - 9x + 27 - \frac{1}{3} = 0$

$y - 9x + \frac{80}{3} = 0$

$3y - 27x + 80 = 0$

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1. $y = 2x^2$ at the point (1, 2)

$y = 2x^2$

$m = \frac{dy}{dx} = 4x, \left.\frac{dy}{dx}\right|_{x \to 1}$

$m = 4$

equation of the tangent

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

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

$y - 2 = 4x - 4$

$y - 2 - 4x + 4 = 0$

$y - 4x + 2 = 0$

equation of the normal

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

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

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

$4y - 8 = -x + 1$

$4y - 8 + x - 1 = 0$

$4y + x - 9 = 0$

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

$y = 3x^2 - 2x$

$m = \frac{dy}{dx} = 6x - 2, \left.\frac{dy}{dx}\right|_{x \to 2}$

$m = 6(2) - 2 = 12 - 2 = 10$

equation of the tangent

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

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

$y - 8 = 10x - 20$

$y - 8 - 10x + 20 = 0$

$y - 10x + 12 = 0$

equation of the normal

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

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

$10(y - 8) = -1(x - 2)$

$10y - 80 = -x + 2$

$10y - 80 + x - 2 = 0$

$10y + x - 82 = 0$

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

$m = \frac{dy}{dx} = \frac{6x^2 - x^3}{4}$ (quotient rule)

$\frac{dy}{dx} \Big| x \to -1, \; m = \frac{6(-1)^2 - (-1)^3}{4}$

$m = \frac{6+1}{4} = \frac{7}{4}$

equation of the tangent

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

$y - -\frac{1}{2} = \frac{7}{4}(x - -1)$

$y + \frac{1}{2} = \frac{7}{4}(x+1)$

$4(y + \frac{1}{2}) = 7(x+1)$

$4y + \frac{4}{2} = 7x + 7$

$4y + 2 = 7x + 7$

$4y + 2 - 7x - 7 = 0$

$4y - 7x - 5 = 0$

equation of the normal

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

$y - -\frac{1}{2} = \frac{-1}{7/4}(x - -1)$

$y + \frac{1}{2} = \frac{-4}{7}(x+1)$

$7(y + \frac{1}{2}) = -4(x+1)$

$7y + \frac{7}{2} = -4x - 4$

$7y + \frac{7}{2} + 4x + 4 = 0$

$7y + 4x + \frac{15}{2} = 0$

$14y + 8x + 15 = 0$

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

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

$\frac{dy}{dx} \Big| x \to -2$

$m = -2(-2) + 1 = 4 + 1 = 5$

equation of the tangent

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

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

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

$y + 5 = 5x + 10$

$y + 5 + 5x - 10 = 0$

$y - 5x - 5 = 0$

equation of the normal

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