$3y + 3/2 = -x + 1$

$3y + 3/2 + x - 1 = 0$

$3y + x + 3/2 - 1 = 0$

$3y + x + 1/2 = 0$

$6y + 2x + 1 = 0$

(b) at the tangent

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

$$\frac{y + 1/2}{x + 1} \times \frac{3}{1}$$

$y + 1/2 = 3x + 3$

$y - 3x + 1/2 - 3 = 0$

$y - 3x - 5/2 = 0$

$2y - 6x - 5 = 0$

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

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

$$\frac{dy}{dx} = 1 - 2(-2) = 1 + 4 = 5$$

$$\frac{y + 5}{x + 2} = 5$$

(a) at the tangent $m_1 = m_2$

$$\frac{y + 5}{x + 2} = 5$$

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

$y - 3x + 5 - 10 = 0$

$y - 5x - 5 = 0$

(b) at the normal $m_2 = \frac{-1}{m_1}$

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

$5y + 25 = -x - 2$

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

$5y + x + 27 = 0$

(5) $y = 1/x$ at point $(3, 1/3)$

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

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

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

(a) at the tangent $m_1 = m_2$

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

$9y - 3 = -x + 3$

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

$9y + x - 6 = 0$

(b) at the normal $m_2 = \frac{-1}{m_1}$

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

$9x - 27 = y - 1/3$

$9x - y + 1/3 - 27 = 0$

$-y + 9x \quad y - 1/3 - 9x + 27 = 0$

$y - 9x - 1/3 + 27 = 0$

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

$3y - 27x + 80 = 0$

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① $y = 2x^2$ at the $(x_1, y_1) = (1, 2)$

$\frac{dy}{dx} = 4x$

$\frac{dy}{dx} = 4(1) = 4 = m_1$

(a) equation of the tangent

$m_1 = m_2$

$\frac{y_2 - y_1}{x - x_1} = m_2$

$\frac{y-2}{x-1} \times \frac{4}{1}$

$4x - 4 = y - 2$

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

$y - 4x + 2 = 0$

(b) equation of the normal

$m_2 = \frac{1}{-m_1}$

$m_2 = \frac{-1}{4}$

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

$4y - 8 = -x + 1$

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

$4y + x - 9 = 0$

② $y = 3x^2 - 2x$ $(2, 8)$

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

$\frac{dy}{dx} = 6(2) - 2$

$\frac{dy}{dx} = 10 = m_1$

(a) equation of the tangent $m_1 = m_2$

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

$y - 8 = 10x - 20$

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

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

$y - 10x + 12 = 0$

(b) equation of the normal

$m_2 = \frac{-1}{m_1}$

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

$10y - 80 = -x + 2$

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

$10y + x - 82 = 0$

③ $y = \frac{x^3}{2}$ $(x_1, y_1) = (-1, -\frac{1}{2})$

$\frac{dy}{dx} = 3x^2$

$\frac{dy}{dx} = 3(-1)^2$

$= 3 = m_1$

(a) at the normal $m_2 = \frac{-1}{m_1}$

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