

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

$$y = 1/10x + 8$$

For the normal equation:

$$m = -1/10 = -1/10$$

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

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

$$10y + x - 82 = 0$$

$$10y = -x + 82$$

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

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

$$m = \frac{dy}{dx}$$

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

$$m = 3/2$$

Equation of tangent:

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

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

17.  $y = 2x^2$  at  $P(1, 2)$

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

at  $x = 1$   $\frac{dy}{dx} = 4$

Equation of tangent

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

$y - 2 = 4x - 4$

$y = 4x - 2$

For the normal equation

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

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

$4y - 8 = -x + 1$

$4y + x - 9 = 0$  /  $4y = -x + 9$

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

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

$m = \frac{dy}{dx} \Big|_{x=2} = 6(2) - 2 = 10$

Equation of tangent

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

$$2y - 2x - 2 = 0$$

$$2y = 2x + 2$$

For the normal equation

$$m = -1/2 \Rightarrow -2$$

Equation of the normal

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

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

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

$$2y = -2x - 3$$

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

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

$$\frac{dy}{dx}$$

$$m \cdot \frac{dy}{dx} \Big|_{x=-2} = 1 - 2(-2) = 5$$

Equation of tangent

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

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

$$y - 5x - 5 = 0$$

$$y = 5x + 5$$

For the normal equation

$$y + 5 = -1/9(x + 2)$$

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

$$5y + x + 23 = 0 \quad | \quad 5y = -x - 23$$

5. Let  $y = 1/x$  at pt  $(3, 1/3)$

$$y = x^{-1}$$

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

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

Equation of tangent

$$y - 1/3 = -1/9(x - 3)$$

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

$$9y + x - 6 = 0$$

$$9y = -x + 6$$

For the normal line

$$m = -1 / (-1/9) = 9$$

Equation of the normal

$$y - 1/3 = 9(x - 3)$$

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

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

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