$y - 2 = 4x - 4$

$\therefore y - 4x + 2 = 0$ is the equation of tangent.

b) for equation of normal

$$m_2 = \frac{-1}{m_1} = \frac{-1}{4}$$

$$y - y_1 = \frac{-1}{m_1}(x - x_1)$$

$$y - 2 = -1/4\,(x - 1)$$

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

for the equation of tangent

$dy/dx = 6x - 2$

$m_1 = dy/dx \mid x = x_1$

$m_1 = 6(2) - 2$

$\therefore m_1 = 10$

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

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

$y - 8 = 10x - 20$

$\therefore y - 10x + 12 = 0$

b for the equation of the normal

$m_2 = -1/m_1 = -1/10$

$y - y_1 = -1/m_2\,(x - x_1)$

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

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

$10y - 80 = -x + 2$

$\therefore 10y + x - 82 = 0$ is the equation of

$m_1 = dy/dx \mid x = x_1$

$m_1 = 6(-1)^2 - (-1)^3 = 6 - -1 \mid 4 = 7/4$

$\therefore m_1 = 7/4$

$y - y_1 = m_1(x - x_1)$

$y - (-1/2) = 7/4(x+1)$

$y + 1/2 = 7/4(x+1)$

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

For the equation of tangent

$dy/dx = -2x + 1$

$m_1 = dy/dx \mid x = x_1$

$m_1 = -2(-2) + 1 = 5$

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

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

$y + 5 = 5x + 10$

$y - 5x - 5 = 0$ is the equ

b) For the equation of normal:

$m_2 = -1/m_2 = -1/5$

$y - y_1 = m_2(x - x_1)$

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

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

$5y + 25 = -x - 2$

$5y + x + 27 = 0$ is the equat

normal.

$= 1/9$

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

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

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

$9y - 3 = -x + 3$

$\therefore 9y + x = 0$ for equation of tangent

for equation of normal:

$m_2 = -1/m_1 = -1/-1/9 = 9$

$y - y_1 = m_2(x - x_1)$

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

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

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

$\therefore 3y - 27x + 30 = 0$