Problem 1

$y = \dfrac{x-1}{x+1}$

$//\ x - 2y = 2 \rightarrow y = \dfrac{x-2}{2}$

$\dfrac{dy}{dx} = slope = \dfrac{1}{2}$

$\dfrac{dy}{dx} = \dfrac{(x+1)*1 - 1(x-1)}{(x+1)^2} = \dfrac{2}{(x+1)^2}$

$\dfrac{2}{(x+1)^2} = \dfrac{1}{2} \rightarrow (x+1)^2 = 4$

$x+1 = 2 \quad \text{or} \quad x+1 = -2$

$x = 1, x = -3$

$(1,0), m = \dfrac{1}{2} \rightarrow y - 0 = \dfrac{1}{2}(x-1) \rightarrow y = \dfrac{1}{2}x - \dfrac{1}{2}$

$(-3,2), m = \dfrac{1}{2} \rightarrow y - 2 = \dfrac{1}{2}(x+3) \rightarrow y = \dfrac{1}{2}x + \dfrac{7}{2}$

Problem 2

$y = x^2 - 5x + 4$

$x - 3y = 5 \rightarrow y = \dfrac{x-5}{3}$

slope of normal line $= \dfrac{1}{3}$

tangent line slope $= -3$

$\dfrac{dy}{dx} = 2x - 5 = -3 \rightarrow x = 1, y = 0$

$y - 0 = \dfrac{1}{3}(x-1) \rightarrow y = \dfrac{1}{3}x - \dfrac{1}{3}$