Homework 4

P 1. Find an equation for the tangent line to the graph of

$$y = 4 - x^2 - \ln\left(\frac{1}{2}x + 1\right)$$

at $x = 0$.

P 2. Let

$$f(x) = \begin{cases} \cos(\pi(x+2)) + 1, & x \leq -2 \\ |x+1| + 2, & -2 < x \leq 0 \\ \ln(x) - 3, & 0 < x < e \\ \sec(\pi(x-3)), & e \leq x \end{cases}$$

(a) Graph $f(x)$.

(b) Determine all points where $f(x)$ is discontinuous and explain why.

(c) Determine all the points where $f(x)$ is not differentiable and explain why.