CALCULUS I

AUTUMN 2015 - HOMEWORK 2

1. Find the below limits.

a) $\lim_{x\to 0} \sin\left(\dfrac{\pi + \tan x}{\tan x - 2\sec x}\right)$ b) $\lim_{t\to 0} \tan\left(1 - \dfrac{\sin t}{t}\right)$

2. Find the first-order derivative of the below function.

$$f(\theta) = \left(\frac{\sin\theta}{1+\cos\theta}\right)^2$$

3. Find the second-order derivative of the below function.

$$f(x) = \left(1 + \frac{1}{x}\right)^3$$

4. Use implicit differentiation to find dy/dx, for

$$x^3 = \frac{2x - y}{x + 3y}$$

5. Use implicit differentiation to find d^2y/dx^2, for

$$y^2 = x^2 + 2x$$