1) Find :   5 points

$$\lim_{t \to 0} \left(\frac{1}{t\sqrt{1+t}} - \frac{1}{t} \right)$$

2) Find the points P on the graph of the curve $y = x^3$ such that the tangent at this point P has x intercept equals 4.   10 points

3) Find $\frac{dy}{dx}$:   15 points

    a) $y = (\sin 3x)^{(\cos 5x)} + (\cos 7x)^{(\sin 9x)}$.

    b) $\tan\left(\frac{x}{y}\right) = x + y$. Put it in the form $\left(\frac{dy}{dx} = \cdots\right)$

    c) $y = \tanh^{-1}\left(\sqrt{1 + \ln(x^2 + 5x)}\right)$.

4) Find the points on the curve :   10 points

$$y = \operatorname{cosec} x + \sec x \qquad 0 \le x \le \pi/2.$$

Such that the tangent at these points are horizontal.

5) Graph the function :   10 points

$$y = f(x) = \frac{x^2 + 7x + 3}{x^2}.$$

Showing:
    a) The domain of this function, intersection with the axes, and all asymptotes and the points of intersections with them (if any)
    b) Critical points and local extreme.

6) Find the following limit: 10 points

$$\lim_{x \to (0)^+} (1 + \sin 4x)^{(\cot x)}$$

GOOD LUCK