MAT125, Paper Homework 3

1. Let

$$G(x) = \begin{cases} \cos(x) + x \sin\left(\frac{1}{x}\right) & \text{for } x \neq 0 \\ a & \text{if } x = 0 \end{cases}$$

Is it possible to find a real number a so that $G(x)$ is continuous for all x? (If so, what is a?) Justify your answer.

2. Find all horizontal and vertical asymptotes of the curve given by

$$y = \frac{2\,e^x}{e^x - 2}.$$

Justify your answers (limits are useful here). Make sure that you give *exact* answers: that is, if one of your answers is $y = \sqrt{2}$, do not give a decimal approximation like $y = 1.414$.

Sketch the graph of the curve (feel free to use a graphing calculator or computer, if you like).