PROBLEM #1

#1 $\epsilon_M = 10^{-16}$

when $x = -3 \cdot e(-16)$

b/c $3\epsilon_M = 3.33 \cdot 10^{-16}$ ← closer to $3 \cdot 10^{-16}$
      $2\epsilon_M = 2.24 \cdot 10^{-16}$

$$\frac{exp(x)-1}{x} = \frac{(1+x)-1}{x} = \frac{(1-3e-16)-1}{-3e-16} = \frac{1-3\epsilon_M-1}{-3e-16} = \frac{-3\epsilon_M}{-3e-16} = 1.1102$$

when $x = 3 \cdot e - 16$

$$\frac{exp(x)-1}{x} = \frac{(1+x)-1}{x} = \frac{(1+3e-16)-1}{+3e-16} = \frac{1+2\epsilon_M-1}{3e-16} = \frac{2\epsilon_M}{3e^{-16}} = 0.7401$$

#2

$$g(x) = \frac{e^x - e^{-2x}}{x} = \frac{e^{-2x}(e^{3x}-e^0)}{x} = \frac{e^{-2x}(e^{3x}-1)}{x} \quad \leftarrow cubes\ diff$$

#3

$$= \frac{e^{-2x}(\boxed{e^x-1})(e^{2x}+e^x+1)}{x}$$

expm1