1. $f(x) = (1+x)^2 \ln(1+x)$

$x_0 = 0$

$f'(x) = 2(1+x)\ln(1+x) + \frac{(1+x)^2}{1+x}$

$f'(x) = 2(1+x)\ln(1+x) + 1+x$

$f''(x) = 2\left[\ln(1+x) + \frac{1+x}{1+x}\right] + 1$

$2\left[\ln(1+x) + 1\right] + 1$

$f''(x) = 2\ln(1+x) + 3$

$f'''(x) = \frac{2}{1+x}$

2. $V = \frac{f(x_0+h) - f(x_0)}{}$

$V(50) = \frac{f(75) - f(50)}{25}$

$V(50) =$

$\frac{dP}{dt} = 1\times10^{-5} P(15000-P)$

$\int \frac{1}{15000P - P^2}\, dP = \int 1\times10^{-5}\, dt$

3. $t=0 \longrightarrow \quad i = 5000$

$\frac{dP}{dt} = KP(M-P)$

$M = 15000$

$h = 0.01$

$K = 1\times10^{-5}$

$\frac{dP}{dt} = 1\times10^{-5} P(15000-P)$

$\frac{P(t_{i+1}) - P(t_i)}{h} = 1\times10^{-5} P(15000-P)$

$P(t_{i+1}) = 1\times10^{-5} Ph\,(15000-P) + P(t_i)$

$i = 0$

$P(t_1) = 1\times10^{-5}(5000)(0.01)(15000-5000) + 5000$

$P(t_1) = 5005$

4. $f(x) = \dfrac{e^{x} - e^{-x}}{x}$

$$e^{0.1} = 1.105$$

$$e^{-0.1} = 0.9048$$

$$e^{0.1} - e^{-0.1} = 0.2002$$

$$\frac{e^{0.1} - e^{-0.1}}{0.1} = 2.002 \rightarrow \text{Valor aprox}$$

Error obs: $|2.003335000 - 2002| = 0.001335$

Error rel: $\dfrac{|2.003335000 - 2002|}{2.003335000} = 0.00066638879$