1) Determine the Taylor polynomial of degree 4 of $f(x) = \ln(1 + x) - x^2 \sin x$ at $a = 0$. (Hint: It may help to use the Maclaurin series of $\sin x$ and the geometric series with sum $\frac{1}{1+x}$. Note that the Maclaurin series of $\sin x$ is

$$\sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{(2n+1)!}.)$$

2) Determine an upper bound for the error in approximating the function $f(x) = \cos x$ by $1 - \frac{x^2}{2} + \frac{x^4}{24}$ on the interval $[-\pi/2, \pi/2]$.