MAT 137 (Calculus II) Prof. Swift

More Applications of Taylor Series

1. Starting with the first 3 nonzero terms in the Taylor series for $\sin(x)$, write out the first two nonzero terms in the Taylor series for $\dfrac{\sin(x) - x}{x^3}$.

2. Use the result of problem 1 to evaluate $\lim\limits_{x \to 0} \dfrac{\sin(x) - x}{x^3}$, without using L'Hospital's Rule.

3. Write out the first 3 nonzero terms of the Taylor series of e^{-t^2}.

4. Find the first 3 nonzero terms of the Taylor series of $F(x) = \displaystyle\int_0^x e^{-t^2} dt$.

5. Find the value of $F^{(5)}(0)$, the fifth derivative of F evaluated at 0, using the answer to problem 4.