# Applications of Taylor Polynomials

**Solutions should show all of your work, not just a single final answer.**

1. Determine the 3rd-degree Taylor polynomial $T_3(x)$ for $\sqrt{x}$ at $x = 4$ and use Taylor's inequality to estimate the error $|\sqrt{x} - T_3(x)|$ if $|x - 4| \leq .5$.

2. Use Taylor's inequality to determine a partial sum for the Maclaurin series of $\cos x$ (with $x$ in radians) that is within .0001 of $\cos 2$.

3. The 2nd-degree Taylor polynomial to $\cos x$ at 0 is $1 - x^2/2$. Use the Alternating Series Estimation Theorem to determine an interval $[-d, d]$ in which $|\cos x - (1 - x^2/2)| \leq .001$ throughout.

4. T/F (with justification)

   The 2nd-degree Taylor polynomial at 0 for $\sqrt{1 + x}$ is $1 + (1/2)x - (1/4)x^2$.