Let $f(x) = \sin(x)$ and let $P_5(x)$ be the 5th order Taylor polynomial for $f(x)$ at $x_0 = \pi$.

1. Find $P_5(x)$
2. Verify your answer by graphing $P_5(x)$ and $f(x)$ on the same set of axes.
3. Use $P_5(x)$ to find an approximation for $\sin(4)$ and for $\sin(6)$. Will these be larger or smaller than the actual value of $\sin(6)$? From the graphs, do they look like good approximations or bad?
4. Find an interval centered at π in which the approximation error $|\sin(x) - P_5(x)|$ is less than .01.

Let $f(x) = \ln(x)$ and let $P_5(x)$ be the 5th order Taylor polynomial for $f(x)$ at $x_0 = 1$.

1. Find $P_5(x)$
2. Verify your answer by graphing $P_5(x)$ and $f(x)$ on the same set of axes.
3. Use $P_5(x)$ to find an approximation for $\ln(1/2)$ and for $\ln(2)$. Will these be larger or smaller than the actual value of $\ln(1/2)$ and $\ln(2)$? How good approximations are they?
4. Find an interval centered at 1 in which the approximation error $|\ln(x) - P_5(x)|$ is less than .01.