Note: Show all work. Correct answers given without justification will not receive full credit.

Name:
ID #:

Question 1) Consider the function $f(x) = \sqrt{4 + x}$.

a) Find $P_4(x)$, the $4^{th}$ order MacLaurin polynomial of $f(x)$. 


b) Use $P_4(x)$ to find an estimate for $\sqrt{5}$.

c) Use Taylor’s Theorem to approximate the error of your estimate from part (b) on the interval $[0, 2]$. Recall that error bounds for estimates using a Taylor Polynomial $P_n(x)$ may be determined using:

$$|f(x) - P_n(x)| \leq \frac{K_{n+1}}{(n + 1)!}|x - x_0|^{n+1},$$

where $K_{n+1}$ is a constant such that $|f^{(n+1)}(x)| \leq K_{n+1}$ for all $x$ in $[0, 2]$. 