Remember - We don’t expect that everyone will solve every problem, but we do expect that everyone make a serious attempt at every problem and explain what you tried when you can’t solve a problem.

Math 1220, Fall 2017

1) a) Find the first degree Taylor polynomial $P_{1,\pi/2}(x)$ for $f(x) = \cos x$ at $a = \pi/2$. Show

$$\lim_{x \to \pi/2} \frac{P_{1,\pi/2}(x) - f(x)}{x - \frac{\pi}{2}} = 0.$$ 

Show that for any other first degree polynomial $L(x)$ the $\lim_{x \to \pi/2} \frac{L(x) - f(x)}{x - \frac{\pi}{2}} \neq 0$.

b) Formulate the corresponding statement for the $n$th degree Taylor polynomial and any other $n$th degree polynomial.

2) Find the smallest $n$ such that the $n$th degree Taylor polynomial for $f(x) = \cos x$ gives an approximation accurate to $10^{-7}$ on the interval $[\pi - 3, \pi + 3]$. Wait! I said the $n$th degree Taylor polynomial. What value of $a$ should you use?