

Writing Problem 3 - Math 126C - Spring 2009

1. Suppose a function f has a Taylor series representation based at $b = 0$. Show that if f is even, then its Taylor series consists of only even terms, and if f is odd, then its Taylor series consists of only odd terms.

2. Use Taylor series to prove (formally) Euler's formula

$$e^{i\theta} = \cos \theta + i \sin \theta$$

where i is the base of the imaginary numbers, with $i^2 = -1$, and θ is any real value. Conclude the famous identity

$$e^{i\pi} = -1.$$