

MA 129 - Homework - November 29, 2007

Taylor Polynomials

Basic Problems from Stewart: 8.9: 1 - 25 (o)

NOTE: Problem 9 says to use a computer algebra system, but this is only needed to **graph** the Taylor polynomials, you can **find** the Taylor polynomials using  $\sec x = 1/\cos x$ .

Harder Problems from Stewart: 8.9: 22.

Additional Problems:

1) We previously showed

$$x^2 - \cos x = 0$$

has exactly two solutions.

a) Use the Taylor polynomial of  $\cos x$  to show that the solutions are approximately

$$\pm\sqrt{\frac{2}{3}}$$

b) Find an upper bound on the error. Find values  $a, b$  such that  $a < x < b$  for each solutions  $x$ .

2)

a) Use Taylor polynomials of degree 1 to approximate the solutions to the equation

$$2x^2 = x \sin x + \cos^2 x$$

EXTRA CREDIT PROBLEM

2) Use Taylor's Theorem and Taylor's Inequality to prove that if  $f(x)$  satisfies:

$$\begin{aligned} f'(x) - f(x) &= 0 \\ f(0) &= 0 \end{aligned}$$

then  $f(x) = 0$ .