21-112 Calculus II

Homework #15

December 3, 2005

All problems are taken from *Calculus* by James Stewart (5th ed).

4.9.7. Use Newton's Method with the specified initial approximation x_1 to find x_3, this third approximation to the root of the given equation. (Give your answer to four decimal places.)

$$x^4 - 20 = 0, \quad x_1 = 2.$$

4.9.29.

1. Apply Newton's method to the equation $x^2 - a = 0$ to derive the following square-root algorithm (used by the ancient Babylonians to compute $\sqrt{a}$):

$$x_{n+1} = \frac{1}{2}\left(x_n + \frac{a}{x_n}\right)$$

2. Use part (1) to compute $\sqrt{1000}$ correct to six decimal places.

4.9.31. Explain why Newton's method doesn't work for finding the root of the equation $x^3 - 3x + 6 = 0$ if the initial approximation is chosen to be $x_1 = 1$.

11.2.6. Determine whether the series is convergent or divergent. If it is convergent, find the sum of the series:

$$\sum_{n=0}^{\infty} (.06)^n$$

11.2.3. Determine whether the series is convergent or divergent. If it is convergent, find the sum of the series:

$$\sum_{n=0}^{\infty} \frac{12}{(-5)^n}$$

11.2.3. Determine whether the series is convergent or divergent. If it is convergent, find the sum of the series:

$$\sum_{n=0}^{\infty} \frac{(-5)^n}{12}$$