Section 9.9 – Convergence of Taylor Series

2. Use the Remainder Estimation Theorem and the method of Example 3 to prove that the Taylor series for e^x about $x = 1$ convergest to e^x for all *x*.

3-10 Approximate the specified function value as indicated and check your work by comparing your answer to the function value produced by your calculating utility.

3. Approximate $\sin 4^{\circ}$ to five decimal-place accuracy using both of the methods given in Example 2.

7. Approximate $\sin 85^{\circ}$ to four decimal-place accuracy using an appropriate Taylor series.

11. a. Use Formula 12 in the text to find a series that converges to $\ln 1.25$.

b. Approximate $\ln 1.25$ using the first two terms of the series. Round your answer to three decimal places, and compare the result to that produced directly by your calculating utility.

13. a. Use the Maclaurin series for $\tan^{-1} x$ to approximate $\tan^{-1} \frac{1}{2}$ and $\tan^{-1} \frac{1}{3}$ to three decimal-place accuracy.

b. Use the results in part (a) and Formula 16 to approximate π.

c. Would you be willing to guarantee that your answer in part (b) is accurate to three decimal places? Explain your reasoning.

d. Compare your answer in part (b) to that produced by your calculating utility.

17. Use Formula 17 for the binomial series to obtain the Maclaurin series for:

a. $\frac{1}{1+x}$ b. $\sqrt[3]{1+x}$ c. $\frac{1}{(1+x)^3}$