Math 2423 homework

38. (4/24) Suppose that $f(x)$ is a function whose third derivative $f^{(3)}(x)$ exists and is continuous. Define $E_2(h)$ by the formula $f(a+h) = f(a) + f'(a)h + \frac{1}{2!}f''(a)h^2 + E_2(h)$.

    1. Use integration by parts to calculate that $E_2(h) = \displaystyle\int_0^h \tfrac{1}{2!}(h-t)^2\, f^{(3)}(a+t)\, dt$.
    2. Let m be the minimum and M the maximum of $f^{(3)}$ on the interval $[a, a+h]$. Show that $\frac{1}{3!}h^3\, m \le E_2(h) \le \frac{1}{3!}h^3\, M$.
    3. Use the Intermediate Value Theorem to show that there exists c in $[a, a+h]$ so that $E_2(h) = \frac{1}{3!}f^{(3)}(c)\, h^3$.

39. (4/24) 8.3 as many as needed from # 1-32, including at least 4-6, 21-24, 30-32

40. (4/24) 8.4 as many as needed from # 1-50, including at least 1, 5, 6, 23, 24, 29, 34, 38, 43, 44, 45, 49

41. (4/24) 8.6 # 17, 19, 22, 30, 31

42. 8.7 # 21(c) (S_n only), 22, 46 (use the error formula)

43. 8.8 # 1, 2, as many as needed from 5-40 and 49-54

44. 8.8 # 71

45. 9.1 # 5, 7, 10-13

46. 9.2 # 5, 8, 9, 15, 16, 25