Math 124 – Worksheet 14 (4.1)

(1) In Excercises (i)–(iii), do the following

(a) Find f' and f''

(b) Find the critical points of f

(c) Find any inflection points

(d) Evaluate f at the critical points and the endpoints. Identify the global maxima and minima of f

(e) Sketch f. Indicate clearly where f is increasing or decreasing, and its concavity

(i) $f(x) = x^3 - 3x^2 \quad (-1 \le x \le 3)$

(ii) $f(x) = e^{-x} \sin x \quad (0 \le x \le 2\pi)$

(iii) $f(x) = x^{-2/3} + x^{1/3} \quad (1.2 \le x \le 3.5)$

(2) Find the exact values of the global maximum and minimum of the function

$$h(z) = \frac{1}{z} + 4z^2 \quad \text{for } z > 0$$

(3) Find constants a and b in the function $f(x) = axe^{bx}$ such that $f(\frac{1}{3}) = 1$ and the function has a local maximum at $x = \frac{1}{3}$