AMAT112: Calculus I

Maximum and Minimum Values

1. For each of the following functions, find all critical points and all local extrema.

   a) $f(x) = x^3 - 2x + 4$

   b) $s(t) = t^3(t-5)^2$

   c) $g(y) = y - 4\sqrt{y}$

   d) $h(z) = \sqrt{3 + 2z - z^2}$

   e) $y = \arccos(t^2)$

   f) $g(x) = x^2 \ln(x)$

   g) $f(u) = \dfrac{u+1}{u^2 + 2u + 2}$

   h) $R(s) = \dfrac{1}{\sqrt[3]{1 - s^2}}$

   i) $h(t) = \arcsin(e^t)$

2. For each of the following functions, find the global extrema on the indicated domain.

   a) $f(x) = x^2 - 1, \quad -1 \le x \le 2$

   b) $h(t) = -\dfrac{1}{t}, \quad -2 \le t \le -1$

   c) $g(y) = \sqrt{4 - y^2}, \quad -2 \le y \le 1$

   d) $R(\theta) = \tan(\theta), \quad -\dfrac{\pi}{3} \le \theta \le \dfrac{\pi}{4}$

   e) $f(t) = 2 - |t|, \quad -1 \le t \le 3$

   f) $s(z) = \ln(z+1), \quad 0 \le z \le 3$

   g) $g(u) = e^{-u^2}, \quad -2 \le u \le 1$

   h) $h(s) = 3s^{2/3}, \quad -27 \le s \le 8$