

# Integral Calculus: Homework (due: January 30 before class)

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## 1 Absolute Minimum/Maximum (5 points)

Let  $\mathcal{R}$  be the triangle whose vertices are  $(2, 0)$ ,  $(-1, 0)$  and  $(0, 2)$ . Find the minimum and maximum values of the following function:

$$f(x, y) = x^2 - 2x + y$$

on the boundary of  $\mathcal{R}$ .

## 2 Lagrange Multipliers (5 points)

A firm produces:

$$g(x, y) = x^{4/3}y^{2/3}$$

units of goods per week, utilizing  $x$  units of labour and  $y$  units of capital. If labour costs \$27 per unit, and capital costs \$0.5 per unit, use the method of Lagrange multiplier to find the most cost-efficient division of labour and capital that the firm can adopt if its goal is to produce 6 units of goods per week. Clearly state the objective function and the constraint. You are not required to justify that the solution you obtained is the absolute maximum. A solution that does not use the method of Lagrange multipliers will receive no credit, even if it is correct.