Optimisation 2008—Problems for seminar 3
Thursday 9/10 at 10–12 in M:A (other building) and Friday 10/10 at 15–17 in MA:5

1. (Number 4ab of 2006-04-25)
Consider the optimisation problem
\[
\text{minimise } x^3 - x^2 y \quad \text{subject to } x^4 + 2y^4 \leq \frac{32}{9}, \quad 5x^4 + y^4 \leq 6.
\]
(a) Prove that the solution exists. \hspace{1cm} (0.2)
(b) Check which of the following four points are KKT-points: (0,0),
\((-1,1), (1,-1) \text{ and } (-4/3, 2/3)\)? \hspace{1cm} (0.4)

2. (Number 5 of 2006-01-12)
Consider the optimisation problem
\[
\min(x^2y) \quad \text{subject to } S: \left\{ \begin{array}{l}
x^2 + y^2 \leq 9, \\
x^2 + y \geq 3
\end{array} \right.
\]
(a) Show that the global minimum exists. \hspace{1cm} (0.2)
(b) Calculate all CQ points for the set S. \hspace{1cm} (0.3)
(c) Calculate all KKT points and solve the problem. \hspace{1cm} (0.5)