Summary of lecture 9-

Solution to extra example Chap. 2

- $f(x, y) = xy$ and $g(x, y) = 4x^2 + 2xy + y^2 - 36 = 0$.

- Lagrange multiplier theory gives: $y = \pm 2x$.
  When $y = 2x$, $g = 0 \iff x = \pm\sqrt{3} \implies y = 2x = \pm 2\sqrt{3}$.
  When $y = -2x$, $g = 0 \iff x = \pm 3 \implies y = -2x = \pm 6$.
  So the 4 extrema are: $(\sqrt{3}, 2\sqrt{3}), (-\sqrt{3}, -2\sqrt{3}), (3, -6), (-3, 6)$
  the corresponding values of f are $6, 6, -9, -9$, so the first two
  extrema are maximums and the last two are minimums.