Problem 1. Find the absolute maximum and minimum values of $f(x, y) = 3xy - 6x - 3y + 3$ on the closed triangular region $D$ with vertices $(0, 0)$, $(3, 0)$ and $(0, 5)$.

Problem 2. Use the method of Lagrange multipliers to find the minimum value of $f(x, y) = x^2 + y^2$ subject to the constraint $y(1 + x^2) = 1$.

Problem 3. Work all but one of the following indefinite integrals (and clearly indicate the one that you didn’t work):

(a) $\int \sin(3x) \, dx$
(b) $\int \tan(3x) \, dx$
(c) $\int \tan(3x^2) \, dx$
(d) $\int \sec(3x) \, dx$
(e) $\int \sec^2(3x) \, dx$
(f) $\int xe^{-x^2} \, dx$
(g) $\int \frac{2}{x^2+1} - \frac{1}{x-2} + \frac{1}{(x-2)^2} \, dx$
(h) $\int xe^{3x} \, dx$