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## MA110 - Engineering Mathematics-1 <br> Problem Sheet - 7

## Lagrange Multipliers

1. Find three real numbers whose sum is 9 and the sum of whose squares is as small as possible.
2. Suppose a box with no top is to hold a certain volume $V$. Find the dimensions for the box that results in the minimum surface area.
3. Determine the maxima and minima of $f(x, y, z)=x^{2}-y^{2}$ on the surface $x^{2}+2 y^{2}+3 z^{2}=1$.
4. Find the isosceles triangle of maximum area with fixed perimeter length $C$.
5. Use the method of Lagrange Multipliers to find the maximum and minimum values of the function $f(x, y)=3 x+4 y$ on the circle $x^{2}+y^{2}=1$.
