Multivar Quiz #3 Saaif Ahmed

Wednesday, September 23, 2020 3:08 PM

Honor Pledge:

"I have neither given nor received any illegal aid on this exam"

-Saaif Ahmed 9/23/20

Determine the dimensions x, y and z of the rectangular box such that its volume is maximal while the sum of the areas of all its six sides is fixed at 6.

HINT: First solve each of the three equations you will obtain for the Lagrange multiplier λ, or better still, $1/\lambda$.

$V = xyz$
$2xy + 2xz + 2yz = 6$

$\nabla f = < yz, xz, xy >$
$\nabla g = < 4x, 4y, 4z >$

$4x = \lambda$
$4y = \lambda$
$4z = \lambda$

$x = y = z \rightarrow 6x^2 = 6 \rightarrow x^2 = 1 \rightarrow x = 1 = y = z$

Thus max volume is 1