"QUIZ" for Lecture 11

NAME: (print!) Fayed Raza **Section:** 6

E-MAIL SCANNED .pdf OF COMPLETED QUIZ to DrZcalc3@gmail.com (Attachment: q11FirstLast.pdf) ASAP BUT NO LATER THAN Oct. 12, 8:00pm Deadline extended to Oct. 17

1. Use Largange multipliers (no credit for other methods) to find the **smallest** value that $x+y+z$ can be, given that $xyz = 125$

gradient of xyz: $\langle yz, xz, xy \rangle$

gradient of x+y+z: $\lambda\langle 1,1,1 \rangle$

$yz = \lambda$

$xz = \lambda$

$xy = \lambda$

$x^2y^2z^2 = \lambda^3$

$5+5+5$

15

$xy = \sqrt{\lambda^3}$

$z = \sqrt{\lambda}$

$z = \sqrt{\lambda}$

$x = \sqrt{\lambda}$

$y = \sqrt{\lambda}$

$\sqrt{\lambda}\cdot\sqrt{\lambda}\cdot\sqrt{\lambda} = 125$

$\lambda^{3/2} = 125^{2/3}$

$\lambda = 25$

2. Use Largange multipliers (no credit for other methods) to find the **largest** value that xyz can be, given that $x + y + z = 15$

$\lambda\langle 1,1,1 \rangle$

$(xyz)^2 = \lambda^3$ $\langle yz, xz, xy \rangle$

$yz = \lambda$

$xz = \lambda$

$xy = \lambda$

$5(6)(5)$

125

$xyz = \sqrt{\lambda^3}$

$xy = \sqrt[2]{\lambda^3}$

2

$3\sqrt{\lambda} = 15$ $\sqrt{\lambda} = 5$

$\lambda = 25$

$z = \sqrt{\lambda}$ $y = \sqrt{\lambda}$

$x = \sqrt{\lambda}$

$x = y = z = 5$