"QUIZ" for Lecture 11

NAME: (print!) Orion Kress-Sanfilippo **Section:** 22

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 $xyz = 125$

$f(x,y,z) = x+y+z$ $\quad g(x,y,z) = xyz = 125$

$\nabla f = \langle 1, 1, 1 \rangle$ $\quad \nabla g = \langle yz, xz, xy \rangle$.

$1 = \lambda yz$ $\quad 1 = \lambda xz$

$1 = \lambda xy$ $\quad 125 = xyz$

Solved using MATLAB:

$\lambda = \frac{1}{25}$ (and some imaginary sol'ns)

$x = y = z = 5$

Ans: Smallest Value is $f(5,5,5) = 15$

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

$f(x,y,z) = xyz$ $\quad g(x,y,z) = x+y+z = 15$

$\nabla f = \langle yz, xz, xy \rangle$ $\quad \nabla g = \langle 1, 1, 1 \rangle$

$yz = \lambda$ $\quad xz = \lambda$

$xy = \lambda$ $\quad x+y+z = 15$

Solved in MATLAB:

When $\lambda = 25$,

$x = 5, y = 5, z = 5$

When $\lambda = 0$, $xyz = 0$

Ans: Largest value is $f(5,5,5) = 5^3 = 125$

(Am I allowed to use MATLAB in this way?)