

"QUIZ" for Lecture 11

NAME: (print!) Andrew King Section: 23

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

$$\nabla f = \langle 1, 1, 1 \rangle \quad \nabla g = \langle yz, xz, xy \rangle$$
$$1 = 2yz \quad x = 2xz \quad 1 = 2xy$$

$$x = y = z = 5$$

$$f(5, 5, 5) = 15$$

$$\boxed{\text{Min} = 15}$$

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

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

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

$$3x = 15$$

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

$$f(x, y, z) = xyz$$

$$(5)(5)(5) = 125$$

$$\boxed{\text{Max} = 125}$$