

First Name: _____ ID# _____

Last Name: _____

Section: _____

= { $3a$ Tuesday with Allen Boozer
 $3b$ Thursday with Allen Boozer
 $3c$ Tuesday with Steven Gagniere
 $3d$ Thursday with Steven Gagniere
 $3e$ Tuesday with Francis White
 $3f$ Thursday with Francis White

Rules.

- There are **FOUR** problems; ten points per problem.
- There is an extra page at the end. You may also use the backs of pages.
- No calculators, computers, notes, books, crib-sheets,...
- Out of consideration for your class-mates, no chewing, humming, pen-twirling, snoring, ... Try to sit still.
- Turn off your cell-phone, pager,...

1	2	3	4	Σ

(1) Determine the average value of

$$f(x, y) = 3x + 2y$$

over the region where $1 \leq x \leq 2$ and $0 \leq y \leq 3$.

(2) The joint probability density function of X and Y is given by

$$p(x, y) = \frac{e^{-(x^2+y^2)/2}}{2\pi}$$

where (x, y) ranges over the entire plane. Determine the median of $X^2 + Y^2$.

(3) Evaluate the following by reversing the order of integration.

$$\int_0^1 \int_0^y \sin((x-1)^2) dx dy + \int_1^2 \int_0^{2-y} \sin((x-1)^2) dx dy$$

Hint: Reversing the order will allow you to combine the two regions into one.

(4) Determine the volume of the region defined by the following inequalities

$$z \geq 0, \quad x^2 + y^2 \leq z^2 + 1, \quad x^2 + y^2 + z^2 \leq 7$$

extra paper