Math 241 Σxam 3 Fall 2017 **∫ustin ∇∇yss-Gallifent**

Directions: Do not simplify, evaluate or integrate unless indicated. No calculators are permitted. Show all work as appropriate for the methods taught in this course. Partial credit will be given for any work, words, pictures or ideas which are relevant to the problem.

Please put problem 1 on answer sheet 1

1. (a) Evaluate and simplify the following integral. [8 pts]
This is the only integral you need to evaluate.

$$\int_0^2 \int_x^{x+1} x \, dy \, dx$$

(b) Reparametrize the following integral as polar. [12 pts]
Do not evaluate.

$$\int_0^{\sqrt{2}} \int_y^{\sqrt{4-y^2}} \sqrt{x^2+y^2} \, dx \, dy$$

Please put problem 2 on answer sheet 2

2. (a) Let R be the region inside the circle $r = 3\sin\theta$ and outside the cardioid $r = 1 + \sin\theta$. [10 pts]
Set up the iterated double integral in polar coordinates for $\iint_R y \, dA$.
Do not evaluate.

(b) Let R be the horizontally simple region between the graphs of $x = y^2$ and $x = 2y$. Write down the iterated double integral in rectangular coordinates for $\iint_R x \, dA$. [10 pts]
Do not evaluate.

Please put problem 3 on answer sheet 3

3. Let D be the solid bounded on the sides by the planes $y = 2x$, $x = 0$ and $y = 2$, below by the xy-plane and above by the sphere $x^2 + y^2 + z^2 = 25$. If the density of D at any point is given by $f(x, y, z) = xz$, write down the iterated triple integral in rectangular coordinates for the mass of D. [20 pts]
Do not evaluate.

Please put problem 4 on answer sheet 4

4. Let D be the solid between the cones $z = \sqrt{x^2+y^2}$ and $z = \sqrt{3x^2+3y^2}$ and inside the cylinder $x^2 + y^2 = 9$. Write down the iterated triple integral in spherical coordinates for the volume of D. [20 pts]
Do not evaluate.

Please put problem 5 on answer sheet 5

5. (a) Write down a parametrization of the cylinder of radius 3 whose axis lies along the y-axis and which extends from $y = -2$ to $y = 4$. [5 pts]

(b) Let R be the region $4x^2 + 9y^2 \leq 16$. Perform a change of variables to rewrite $\iint_R xy \, dA$ as an integral over a disk in the uv-plane and then parametrize to get an iterated integral in polar coordinates. [15 pts]
Do not evaluate.

The End and the TA Section List

Tessa	0411 = 8:00	0421 = 9:00
Weikun	0412 = 8:00	0422 = 9:00
Shuo	0431 = 10:00	0441 = 11:00
Zeyad	0432 = 10:00	0442 = 11:00