**Multivariable Calculus – Fall 2015**

**Test 2**

Answer all questions carefully and completely. Put all work and your answers on the paper provided. Partial credit may be awarded, so please show all of your work.

**Do Not Use A Calculator For This Test.**

**Part 1 (10 points)**

Let be a continuous function and let be a rectangle in the plane.

1. What is the definition of ?
2. What does Fubini’s Theorem say about the integral ?

**Part 2 (15 points)**

Let be the region inside the circle and outside . Give iterated integrals for the double integral:

**Do not evaluate this integral**

**Part 3 (20 points) DO ONE OF TWO:**

 

**For A For B**

1. Let be the region in above below the plane and inside the cylinder . Assume the density at any point is proportional to its distance to the -axis. It is a fact that center of mass is on the -axis. What are the coordinates of the center of mass?
2. Let be the region contained inside , above the -plane, and below . What is the average distance to the origin for points in ?

**Part 4 (15 points)**

Let be the region in bounded by the graphs of ; ; ; and

1. Set up a triple integral representing the volume of .
2. Give iterated integrals describing the triple integral given above.

**Do not evaluate this integral.**

**Part 5 (20 points)**

Let be the part of the graph between (0,0) and (2,8). Calculate:

**Part 6 (20 points) DO ONE OF TWO**

1. Let be the region in bounded by the three curves: ; and . Evaluate the double integral by changing variables using the transformation .
2. Let be the part of the graph of that lies over triangle whose vertices are (0,0), (2,0) and (2,2). Give a surface integral describing the surface area of . Evaluate this integral. [Hint: Your calculation will be easier if you let be the outside variable when changing into iterated integrals.]

**Bonus**

1. Give one set of iterated integrals describing the area of the region in enclosed by both circles: and



1. What is the average distance to the -axis for points inside the circle:

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