Name: ——————————————————————— |_____ / 25|

30 minutes maximum. No aids (book, calculator, etc.) are permitted. Show all work and use proper notation for full credit. Answers should be in reasonably-simplified form. 25 points possible.

1. **[5 points]** Find the area of the region between $y = \sin x$ and $y = \cos x$ on the interval $[0, \pi/2]$. (*Hint: Draw a careful sketch first! You may use symmetry if you want.*)

2. **[15 points]**

   a. Sketch the region bounded by $y = x^2$, $y = 0$, and $x = 1$. Then sketch the solid of revolution formed by rotating the region around the x-axis. **Please make your sketches adequately large and clear!**

b. Find the volume of the solid which you sketched in part **a**. (*Hint: Use discs or washers.*)

c. Find the volume of the solid formed by revolving the region in part **a** around the *y*-axis. (*Hint: Sketch the solid. Use discs or washers.*)

3. **[5 points]** A solid has a base which is the unit circle in the x, y plane, and each cross-section parallel to the y-axis is a square. Find the volume.

EC. **[1 points]** (**Extra Credit**) Give the correct value of the definite integral:

$$\int_{-1}^{1} \sqrt{1-x^2}\, dx.$$

(**Hint.** There is no requirement to use the fundamental theorem of calculus. What is sought is the correct answer, **with some justification**, which might be a sketch.)

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