Math 252: Quiz 2 **22 January 2026**

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. **Please make your sketches large and clear!** 25 points possible.

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

2. [15 points]

a. Sketch the region bounded by $y = x^2$, $y = 1$, and $x = 0$. Then sketch the solid of revolution formed by rotating the region around the y-axis.

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

c. Find the volume of the solid formed by revolving the region in part **a** around the x-axis. (*Hints: Sketch the solid. Then use discs or washers.*)

3. [5 points] A solid has a base which is the unit disk in the x, y plane, and each cross-section which is perpendicular to the base and parallel to the y-axis is a square. Find the volume. (*Hint: A sketch is a good idea, of course, but what you really want is to understand the side length of the square!*)

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

$$\int_0^2 \sqrt{4-x^2}\,dx.$$

(**Hint.** There is no requirement to use the fundamental theorem of calculus! You want to provide the correct answer, **with a justification**. Your justification might be a sketch.)

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