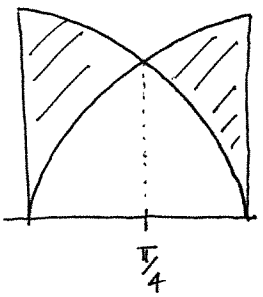
Math 172 | Quiz 2 | Name: _____

18 May 2016 | Show Appropriate Work | Point Values in boxes.

1. [5] Find the area between $y = \sin x$ and $y = \cos x$ for $0 \le x \le \frac{\pi}{2}$.

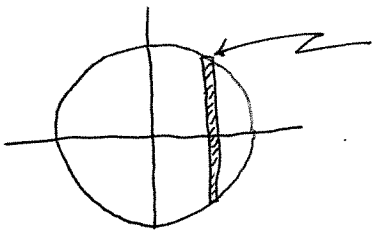


By symmetry, we consider only half.

$$2\int_0^{\pi/4} [\cos x - \sin x]\,dx = 2\Big[\sin x + \cos x\Big]\Big|_0^{\pi/4}$$

$$= 2\left[\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} - 1\right] = 2\left[\sqrt{2} - 1\right]$$

2. [5] A solid is formed with base given by the ~~unit~~ circle $x^2 + y^2 = 4$ and cross sections perpendicular to the x-axis are squares. Find the volume of the solid.



$$V_i = (\text{side})^2\,\Delta x = (2y)^2\,\Delta x = 4y^2\,\Delta x$$

$$= 4(4 - x^2)\,\Delta x$$

$$\text{Volume} = \int_{-2}^{2} 4(4 - x^2)\,dx = 8\int_0^2 (4 - x^2)\,dx$$

$$= 8\left[4x - \frac{x^3}{3}\right]\Big|_0^2 = 8\left(8 - \frac{8}{3}\right) = 8\left(\frac{16}{3}\right) = \frac{128}{3}$$