

QUIZ 3 SOLUTIONS

INSTRUCTIONS

Please answer the following questions to the best of your ability and understanding **within 30 minutes**. Do not use books, notes, the internet, calculators, etc.

PROBLEM 1

(15 Points) Let R be the region obtained by rotating the graph of $y = \sin^2(x)$ for $0 \leq x \leq \pi$ about the y -axis. What is the volume of R ? (**Hint**: a dx integral will be nicer than a dy integral)

PROBLEM 2

(10 Points) Find the area of the region contained between the graphs of $x = y^2 - 2$ and $x = y$.

PROBLEM 3

(15 Points) Use polar coordinates to find the area contained *inside* the circle of radius 1 centered at $(1, 0)$ but *outside* the circle of radius 1 centered at $(0, 0)$.

PROBLEM 4

(10 Points) Let A be the region contained above $y = x^2 + 1$ but below $y = 2 - x^2$. **Set up, but do not solve** an integral which computes the volume of the solid obtained by rotating A about the line $x = -1$.