

NAME _____

TAKE-HOME PROBLEMS 6.4 AND INVERSE CHAIN RULE (20 points)

Given the closed curve whose equation is $25x^2 + 4y^2 = 100$, use it as the base for the solids described in the next three problems. As always, make an appropriate sketch, determine limits of integration and integrand that will answer the question, and then solve the integration problem you have devised to find the desired volume. Show all steps (check work with calculator, if you wish).

1. Find the volume of the solid having the given base in which each cross-section perpendicular to the y -axis is an equilateral triangle with a side in the base.
2. Find the volume of the solid having the given base in which each cross-section perpendicular to the x -axis is a rectangle with width in the base and length half the width.
3. Find the volume of the solid having the given base in which each cross-section perpendicular to the y -axis is an isosceles right triangle having one of its legs in the base.

4. Evaluate: $\int_{-\frac{\pi}{4}}^{\frac{\pi}{3}} \sec x \tan x \sqrt{1 + 4 \sec x} dx$