

Instructions: Show Your Work!

1. (4 pts) Use the method of cylindrical shells to set up **(DO NOT EVALUATE!)** the integral that gives the volume of the solid generated by rotating the region bounded by the curves

$$y = x^2, \quad y = 2 - x^2 \quad \text{about } x = 1.$$

2. (2 pts) Find the average value of the function

$$f(x) = x \tan^{-1}(x)$$

on the interval $[-1, 1]$.

3. (4 pts) Find

$$\int x \sin^2(x^2) dx$$

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1. (4pts) Use the method of cylindrical shells to set up **(DO NOT EVALUATE!)** the integral that gives the volume of the solid generated by rotating the region bounded by the curves

$$x = 2y^2, \quad x = y^2 + 1 \quad \text{about } y = -1.$$

2. (2pts) Find the average value of the function

$$f(x) = (\sin^{-1}(x))^2$$

on the interval $[0, \frac{1}{2}]$.

3. (4pts) Find

$$\int \sin^{5/2}(x) \cos^3(x) dx$$