MATH-241 Calculus I
Worksheet 06

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Fall 2021, 19/11/2021

Last name: _____
First name: _____
Section: _____

Question:	1	2	Total
Points:	10	10	20
Score:			

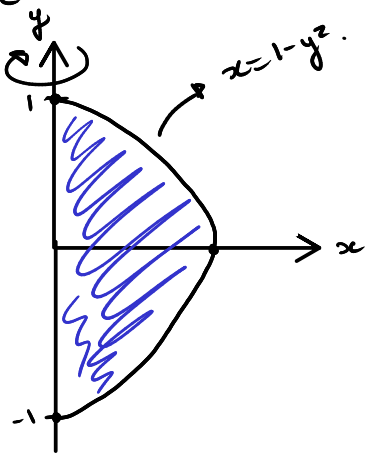
Instructions: You must answer all the questions below and give your solutions to the TA at the end of the recitation. Write your solutions on a different sheet of paper. No late worksheet will be accepted.

Question 1 **(10 pts)**

Describe the solid that the following integral represents

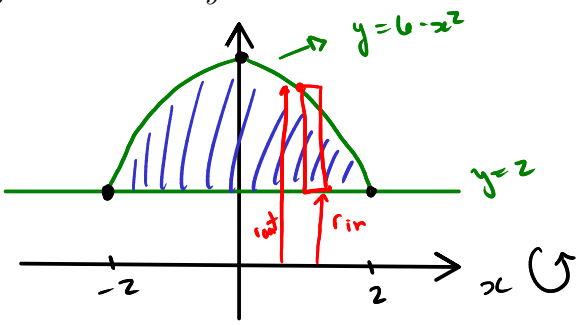
$$\pi \int_{-1}^{1} (1-y^2)^2 \, dy.$$

The radius is $r_{out} = 1-y^2$ and $r_{in} = 0$.
The region looks like and we are rotating around the y axis.



QUESTION 2 (10 pts)

Compute the volume of the solid obtained by rotating about the x-axis the region bounded by $y = 6 - x^2$ and $y = 2$.

① 

$6 - x^2 = 2 \Rightarrow 4 = x^2 \Rightarrow x = \pm 2$

$r_{out} = 6 - x^2$

$r_{in} = 2$

0

② $A = (r_{out}^2 - r_{in}^2)\,\pi = \left((6-x^2)^2 - 4\right)\pi$.

we integrate with respect to x

③ $V = \pi \int_{-2}^{2} \left((6-x^2)^2 - 4\right) dx$

$= \boxed{\frac{384\pi}{5} \text{ units}^3}$.