MATH 16020: Applied Calculus 2 Quiz 7 DUE: Mon. Feb. 27, 2023

Please show **all** your work! Answers without supporting work will not be given credit. Write answers in spaces provided.

Name: Solutions

1. Find the **VOLUME** of the region bounded by

$$x + 3y = 9, \quad x = 0, \quad y = 0$$

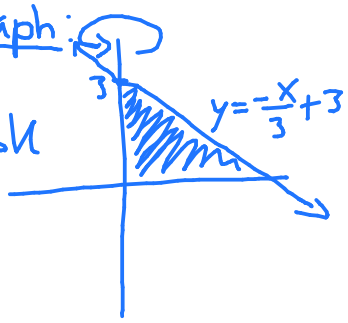
around the y-axis

$x+3y=9$

$3y=-x+9$

$y=\frac{-x}{3}+3$

Graph:



Disk

But y-axis $\Rightarrow dy$

So $x+3y=9$

$x=9-3y$

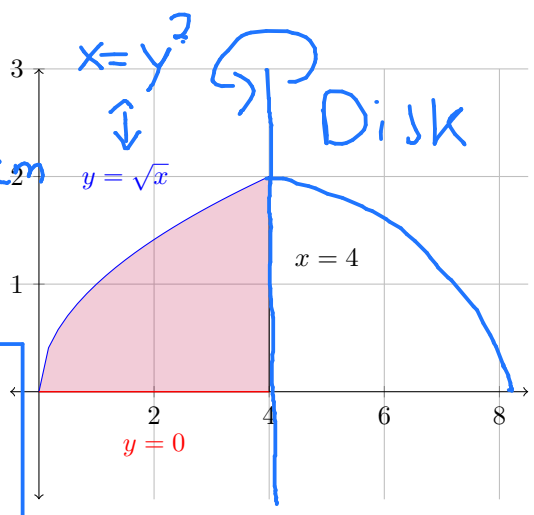
$$V=\pi\int_0^3 (9-3y)^2\,dy$$
$$=\pi\int_0^3 (81-54y+9y^2)\,dy$$
$$=\pi\left(81y-27y^2+3y^3\right)\Big]_0^3$$
$$=81\pi$$

Volume = $\boxed{81\pi}$

2. Let R be the region shown to the right. Set up the integral that computes the **VOLUME** as R is rotated around the line $x = 4$.

dy problem

DON'T COMPUTE IT!!!



Volume = $\boxed{\pi\int_0^2 (y^2-4)^2\,dy}$