

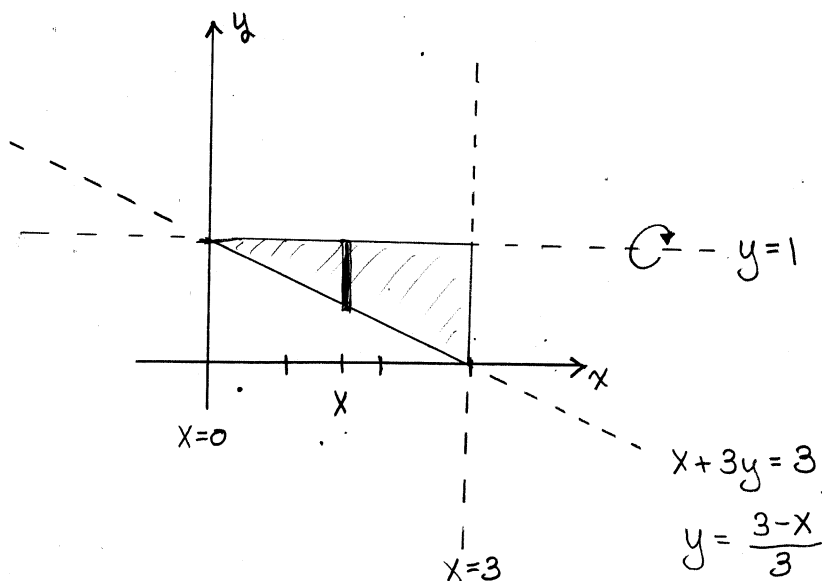
# Math 132 - Quiz 2 (IC)

August 31, 2022

Name key  
Score \_\_\_\_\_

Show all work to receive full credit. Supply explanations when necessary.

1. (4 points) The region bounded by the graphs of  $x + 3y = 3$ ,  $y = 1$ , and  $x = 3$  is rotated about the line  $y = 1$ . Find the volume of the solid that is generated.



Disks ...

$$\begin{aligned} \text{Volume} &= \pi \int_0^3 \left(1 - \frac{3-x}{3}\right)^2 dx = \pi \int_0^3 \frac{x^2}{9} dx \\ &= \frac{\pi}{27} x^3 \Big|_0^3 = \boxed{\pi} \end{aligned}$$

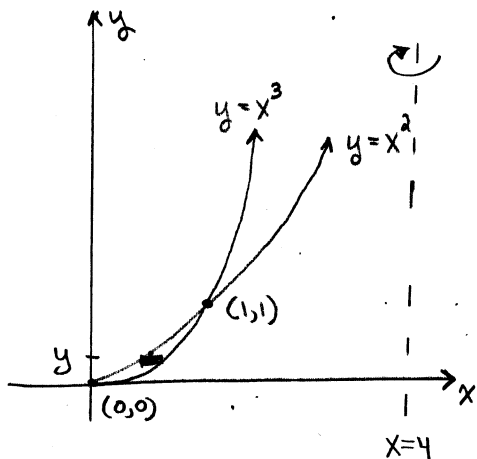
# Math 132 - Quiz 2 (TH)

August 31, 2022

Name key  
Score \_\_\_\_\_

Show all work to receive full credit. Supply explanations when necessary. This quiz is due September 7.

1. (3 points) The 1st quadrant region bounded by the graphs of  $y = x^2$  and  $y = x^3$  is rotated about the line  $x = 4$ . Find the volume of the solid that is generated.



WASHERS...

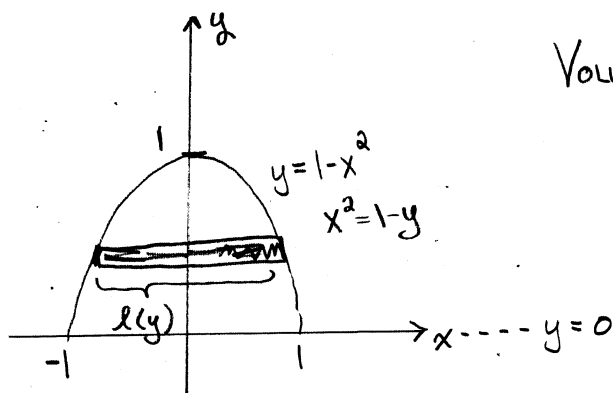
$$\text{Volume} = \pi \int_0^1 \left[ (4 - \sqrt{y})^2 - (4 - \sqrt[3]{y})^2 \right] dy$$

$$= \pi \int_0^1 (-8\sqrt{y} + y + 8\sqrt[3]{y} - \sqrt[3]{y^2}) dy$$

$$= \pi \left[ -\frac{16}{3}y^{3/2} + \frac{1}{2}y^2 + 6y^{4/3} - \frac{3}{5}y^{5/3} \right]_0^1$$

$$= \pi \left[ -\frac{16}{3} + \frac{1}{2} + 6 - \frac{3}{5} \right] = \boxed{\frac{17\pi}{30}}$$

2. (3 points) The base of a solid is the region in the  $xy$ -plane bounded by the graphs of  $y = 0$  and  $y = 1 - x^2$ . The cross sections (slices) perpendicular to the  $xy$ -plane and parallel to the  $x$ -axis are squares. Find the volume of the solid.



$$l(y) = 2\sqrt{1-y}$$

$$\text{Volume} = \int_0^1 [l(y)]^2 dy$$

$$= \int_0^1 4(1-y) dy$$

$$= 4y - 2y^2 \Big|_0^1$$

$$= \boxed{2}$$