

$$(2e^{-x})^2$$

$$4e^{-2x}$$

$$u = -2x$$

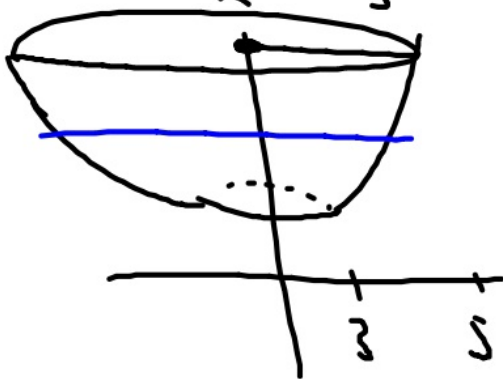
$$du = -2$$

## 7.2B Volume (Again)

WCID? I can <sup>find</sup> the volume of a solid

A. Find the volume when  $y = \sqrt{x^2}$  is revolved around the y-axis

[3.5]



$$x = \sqrt{y}$$

$$V = \pi \int_9^{25} (\sqrt{y})^2 dy$$

$$= \pi \left[ \frac{y^2}{2} \Big|_9^{25} \right]$$

$$= 272\pi$$

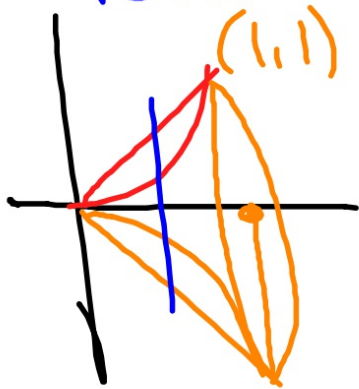
B. Washer Method - when the area between two functions is rotated about the  $x$ -axis,

$$V = \pi \int_a^b \left( (f(x))^2 - (g(x))^2 \right) dx$$

\*\* around a  $y$ : <sup>value</sup> top-bottom

\*\* around an  $x$ : right-left

Ex. Region between  $y=x$  and  $y=x^3$   
rotated around the x-axis 1st quad.

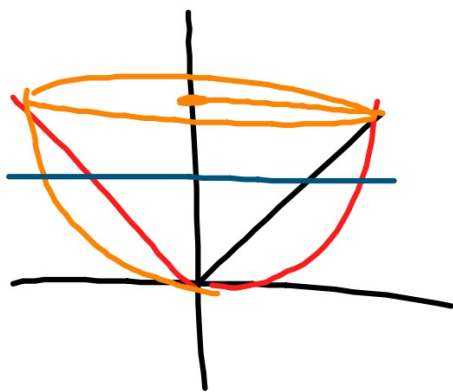


$$\pi \int_0^1 (x)^2 - (x^3)^2 dx$$

$$\pi \int_0^1 x^2 - x^6 dx$$

$$\pi \left[ \frac{x^3}{3} - \frac{x^7}{7} \right]_0^1 = \frac{4\pi}{21}$$

Ex. Same problem, y-axis



$$y = x$$
$$y = \sqrt[3]{x^3}$$

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

$$\frac{4\pi}{15}$$

Pg. 463

4-10

11b, 13a, 14a, 23, 24