

Key

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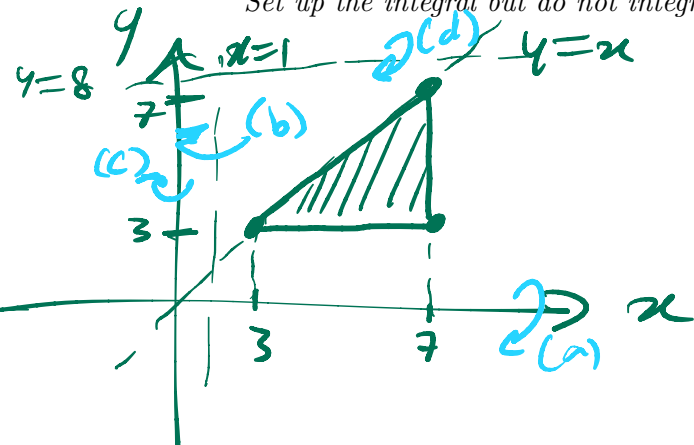
Sign Your Name: Sal

Please clearly organize your work, show all steps, simplify all answers, and **BOX** your answers.

- Set up an integral which will compute the volume of the solid obtained by revolving the triangle with vertices (3, 3), (7, 3), (7, 7) about
 - the x -axis using the washer method,
 - about the line $x = 1$ using the cylindrical shell method.
 - the y -axis using the cylindrical shell method, and
 - the line $y = 8$ using the washer method.

BONUS

Set up the integral but do not integrate or simplify!



(a) shell

$$Vol = \int_a^b 2\pi rh \, dy = \int_3^7 2\pi(y)(7-y) \, dy$$

(b) washer

$$Vol = \int_a^b \pi(R^2 - r^2) \, dy = \int_3^7 \pi(6^2 - (y-1)^2) \, dy$$

(c) Washer

$$Vol = \int_a^b \pi(R^2 - r^2) \, dy = \int_3^7 \pi(7^2 - y^2) \, dy$$

(d) shell

$$Vol = \int_a^b 2\pi rh \, dy = \int_3^7 2\pi(8-y)(7-y) \, dy$$

(a) washer

$$Vol = \int_a^b \pi(R^2 - r^2) \, dx = \boxed{\int_3^7 \pi(x^2 - 3^2) \, dx}$$

(b) shell

$$Vol = \int_a^b 2\pi rh \, dx = \boxed{\int_3^7 2\pi(x-1)(x-3) \, dx}$$

(c) Shell

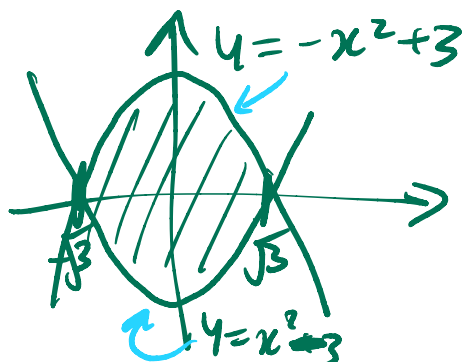
$$Vol = \int_a^b 2\pi rh \, dy = \boxed{\int_3^7 2\pi(x)(x-3) \, dx}$$

(d) washer

$$Vol = \int_a^b \pi(R^2 - r^2) \, dy = \boxed{\int_3^7 \pi(5^2 - (8-x)^2) \, dx}$$

2. Set up an integral which computes the area between the curves $y = -x^2 + 3$ and $y = x^2 - 3$.

Set up the integral but do not integrate or simplify!



$$\int_a^b \text{TOP} - \text{BOT} \, dx$$

intersection points

$$-x^2 + 3 = x^2 - 3$$

$$\Rightarrow 2x^2 - 6 = 0$$

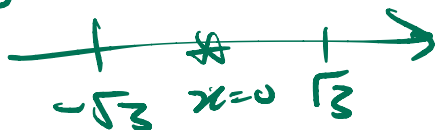
$$\Rightarrow 2(x^2 - 3) = 0$$

$$\Rightarrow 2(x + \sqrt{3})(x - \sqrt{3}) = 0$$

$$\Rightarrow x = \pm \sqrt{3}$$

f: $-0^2 + 3 = 3$ top is f

g: $0^2 - 3 = -3$ bot is g.



$$\text{Area} = \int_{-\sqrt{3}}^{\sqrt{3}} (-x^2 + 3) - (x^2 - 3) \, dx$$

↑
f

↑
g