

I CAME OUT TO HAVE A GOOD TIME
AND I'M HONESTLY FEELING
SO ATTACKED RIGHT NOW
J. CAESAR, 44 BC



Wednesday, March 15, 2017 -

* Opener - Below

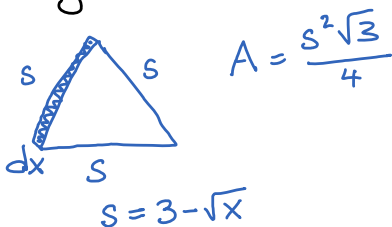
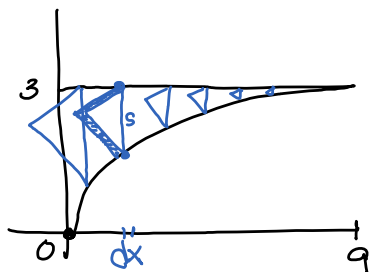
* 8.3 - Volume of Revolution

Opener Find volume of solid generated between y-axis, line $y=3$, $y=\sqrt{x}$ if cross-sections are:

(a) equilateral Δ s \perp to x-axis

(b) squares \perp to y-axis

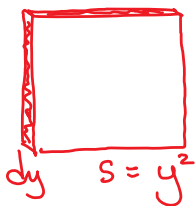
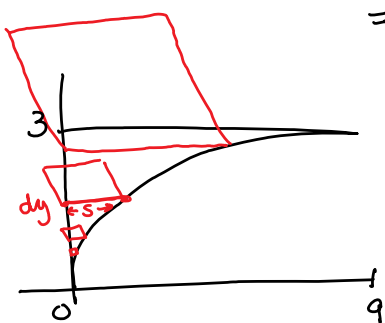
(a)



$$A = \frac{(3-\sqrt{x})^2 \sqrt{3}}{4} = \frac{\sqrt{3}}{4} (9 - 6\sqrt{x} + x)$$

$$\begin{aligned} V &= \int_0^9 \frac{\sqrt{3}}{4} (9 - 6\sqrt{x} + x) dx \\ &= \frac{\sqrt{3}}{4} \left[9x - 6 \cdot \frac{2}{3} x^{\frac{3}{2}} + \frac{1}{2} x^2 \right]_0^9 \\ &= \frac{\sqrt{3}}{4} \left[9x - 4x^{\frac{3}{2}} + \frac{1}{2} x^2 \right]_0^9 = \frac{\sqrt{3}}{4} (9(9) - 4(9)^{\frac{3}{2}} + \frac{1}{2}(9)^2 - 0) \\ &= \frac{\sqrt{3}}{4} (81 - 108 + \frac{81}{2}) = \frac{27\sqrt{3}}{8} \approx \boxed{5.846} \end{aligned}$$

(b)



$$\begin{aligned} A &= s^2 \\ A &= (y^2)^2 = y^4 \end{aligned}$$

$$V = \int_0^3 y^4 dy = \frac{1}{5} y^5 \Big|_0^3 = \frac{1}{5} (3)^5 - \frac{1}{5} (0)^5 = \boxed{\frac{243}{5}}$$

