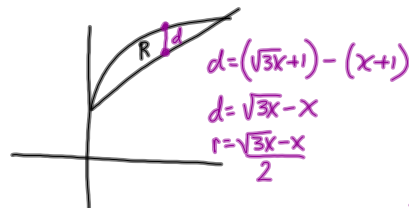


$$\pi \int_1^4 (y-2)^2 - \left[\frac{(y-1)^2}{3} - 1\right]^2 dy$$



Area of SemiCircles: $\pi \left(\frac{\sqrt{3x} - x}{2}\right)^2$

$$\int_0^3 \frac{\pi}{8} (\sqrt{3x} - x)^2 dx$$

$(\sqrt{3x} - x)(\sqrt{3x} - x)$
 $3x - x\sqrt{3x} - x\sqrt{3x} + x^2$

$-2x\sqrt{3}\sqrt{x}$
 $-2\sqrt{3}x \cdot x^{1/2}$
 $-2\sqrt{3}x^{3/2}$

$$\frac{\pi}{8} \int_0^3 (3x + x^2 - 2x\sqrt{3x}) dx$$

$$\frac{\pi}{8} \int_0^3 (3x + x^2 - 2\sqrt{3}x^{3/2}) dx$$

$$= \frac{\pi}{8} \left(\frac{3x^2}{2} + \frac{x^3}{3} - \frac{2\sqrt{3}x^{5/2}}{5/2} \right) \Big|_0^3$$

$$= \frac{\pi}{8} \left(\frac{3x^2}{2} + \frac{1}{3}x^3 - \frac{4\sqrt{3}}{5}x^{5/2} \right) \Big|_0^3$$

$$= \frac{\pi}{8} \left(\frac{27}{2} + 9 - \frac{4\sqrt{3}}{5} \cdot 3^{5/2} - 0 \right)$$