

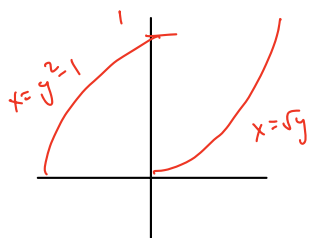
Math 1172

Homework #2

Section 5.1 #3, 17

Section 5.2 #21, 25

5.1 #3



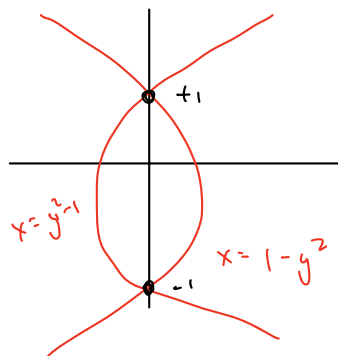
$$\int_0^1 \sqrt{y} - (y^2 - 1) dy$$

$$= \int_0^1 y^{1/2} - y^2 + 1 dy$$

$$= \left. \frac{2}{3} y^{3/2} - \frac{1}{3} y^3 + y \right|_0^1$$

$$= \frac{2}{3} - \frac{1}{3} + 1 = \frac{4}{3}$$

5.1 #17



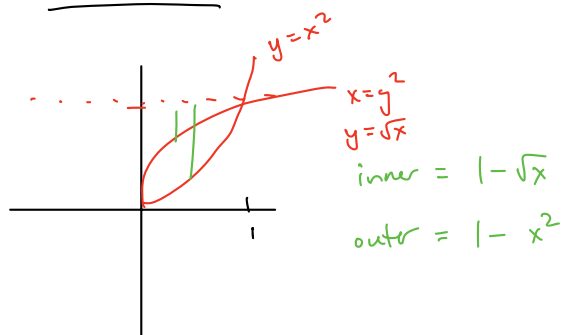
$$\int_{-1}^1 (1 - y^2) - (y^2 - 1) dy$$

$$= \int_{-1}^1 1 - y^2 - y^2 + 1 dy$$

$$= \int_{-1}^1 2 - 2y^2 dy = \left. 2y - \frac{2}{3} y^3 \right|_{-1}^1$$

$$= 2 \cdot 1 - \frac{2}{3} \cdot 1 - \left( 2(-1) - \frac{2}{3}(-1)^3 \right)$$

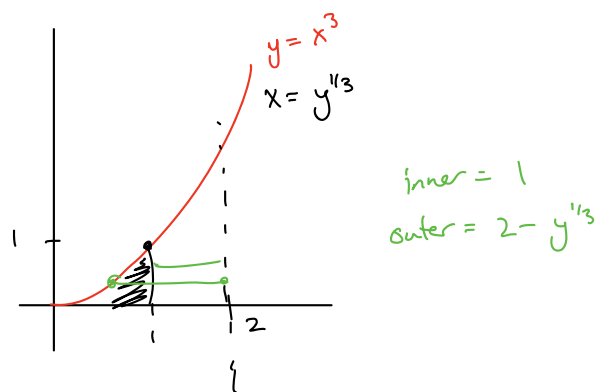
# 5.2 # 21



$$\begin{aligned}
 & \pi \int_0^1 (1 - x^2)^2 - (1 - \sqrt{x})^2 dx \\
 &= \pi \int_0^1 1 - 2x^2 + x^4 - (1 - 2\sqrt{x} + x) dx \\
 &= \pi \int_0^1 \cancel{1} - 2x^2 + \cancel{x^4} - \cancel{1} + 2x^{1/2} - x dx \\
 &= \pi \left( -\frac{2}{3}x^3 + \frac{1}{5}x^5 + 2 \cdot \frac{2}{3}x^{3/2} - \frac{1}{2}x^2 \right) \Big|_0^1 \\
 &= \pi \left( -\frac{2}{3} + \frac{1}{5} + \frac{4}{3} - \frac{1}{2} \right)
 \end{aligned}$$

# 5.2 # 25

$y = x^3$ ,  $y = 0$ ,  $x = 1$   
 about  $x = 2$



$$\begin{aligned}
 & \pi \int_0^1 (2 - y^{1/3})^2 - 1^2 dy \\
 &= \pi \int_0^1 4 - 4y^{1/3} + y^{2/3} - 1 dy \\
 &= \pi \int_0^1 3 - 4y^{1/3} + y^{2/3} dy \\
 &= \pi \left( 3y - 4 \cdot \frac{3}{4}y^{4/3} + \frac{3}{5}y^{5/3} \right) \Big|_0^1
 \end{aligned}$$

$$= \pi \left( 3 - 3 + \frac{3}{5} \right) = \pi \cdot \frac{3}{5}$$