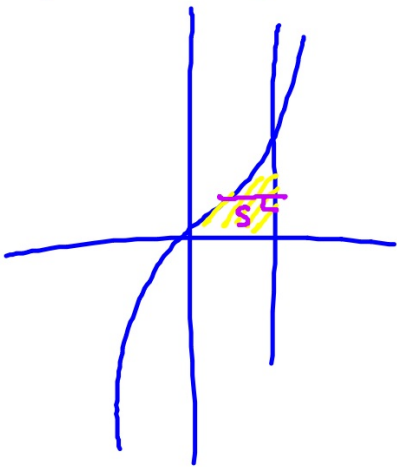


74.)  $y = x^3, y = 0, x = 1$



b.) semicircles  $\perp$  y-axis

$$s = 1 - \sqrt[3]{y}$$

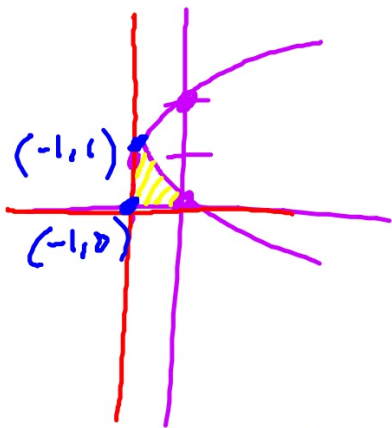
$$\frac{\pi}{8} \int_0^1 s^2 dy = \frac{\pi}{8} \int_0^1 (1 - \sqrt[3]{y})^2 dy$$

$$\frac{\pi}{8} \int_0^1 (1 - 2\sqrt[3]{y} + y^{2/3}) dy$$

4.)  $x = y^2 - 2y$   $x = -1$   $y = 0$

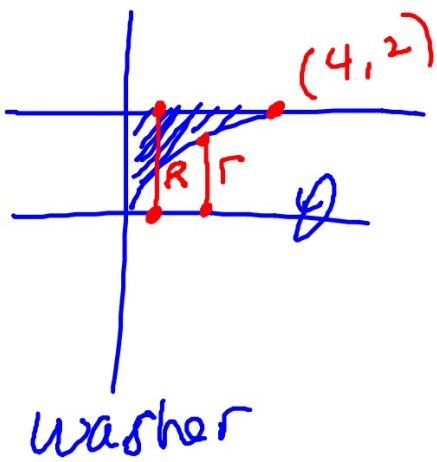
$$\int_0^1 y^2 - 2y - (-1) dy$$

$$\int_0^1 (y^2 - 2y + 1) dy$$



$$x = y(y - 2) \quad \frac{x}{y} = \frac{-1}{1}$$

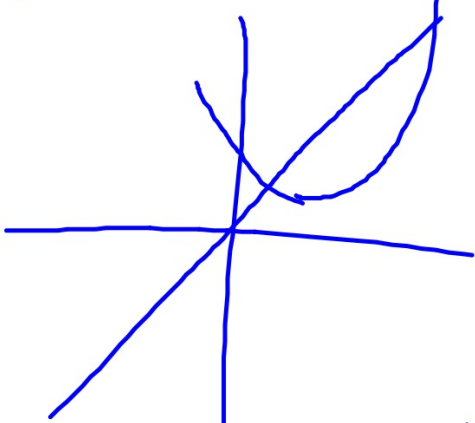
22 a.)  $y = \sqrt{x}$ ,  $y = 2$ ,  $x = 0$   $\curvearrowright$  x-axis



$$\pi \int_0^4 (2-0)^2 - (\sqrt{x}-0)^2 dx$$

$$\pi \int_0^4 (4-x) dx$$

21.)  $y = x, y = x^2 - 3x + 3$



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

$$0 = x^2 - 4x + 3$$

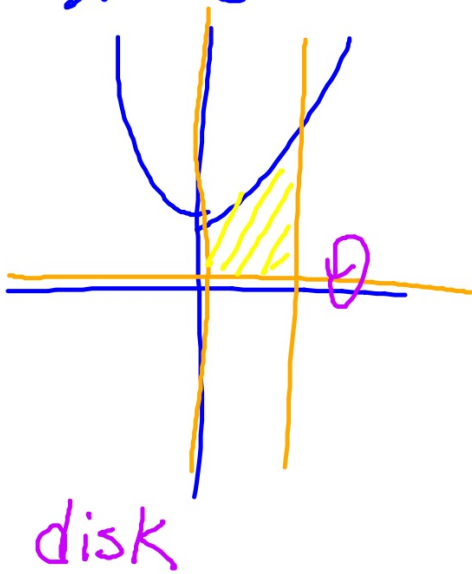
$$0 = (x-3)(x-1)$$

$$\int_1^3 x - (x^2 - 3x + 3) dx$$

$$y' = 2x - 3$$
$$\frac{3}{2} = x$$

$$y = \left(\frac{3}{2}\right)^2 - 3 \cdot \frac{3}{2} + 3$$
$$= \frac{9}{4} - \frac{9}{2} + 3$$
$$= \frac{9 - 18 + 12}{4} = \frac{3}{4}$$

30.)  $y = \sec x$   $x=0$   $y=0$   $x = \frac{\pi}{3}$

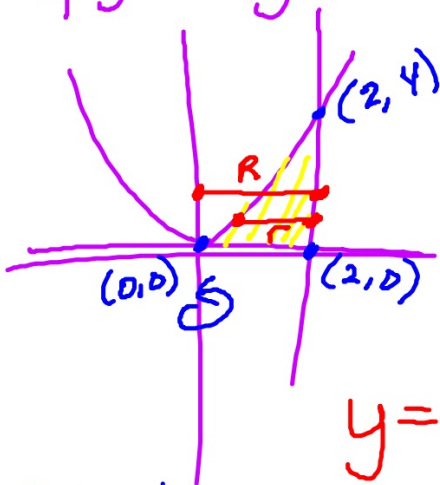


$$\pi \int_0^{\pi/3} (\sec x - 0)^2 dx$$

$$\pi \int_0^{\pi/3} \sec^2 x dx$$

$$\pi \tan x \Big|_0^{\pi/3}$$

45.)  $y = x^2$   $x = 2$   $x$ -axis  $y$ -axis



Washer

$$y = x^2$$

$$\sqrt{y} = x$$

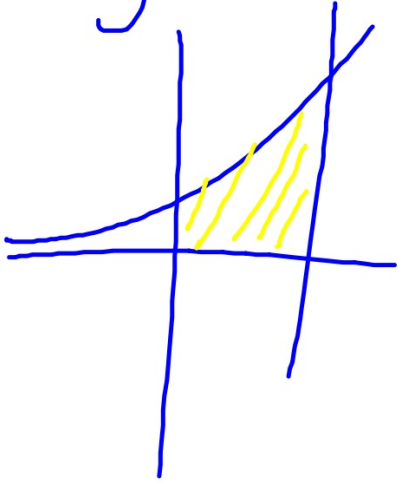
$$\pi \int_0^4 (2-0)^2 - (\sqrt{y}-0)^2 dy$$

$$\pi \int_0^4 (4-y) dy$$

$$\pi \left( 4y - \frac{y^2}{2} \right) \Big|_0^4$$

(A)

15)  $y = e^{x/2}$ ,  $x=0$ ,  $x=2$ ,  $y=0$



$$\int_0^2 (e^{x/2} - 0) dx$$

$$u = \frac{1}{2}x$$
$$du = \frac{1}{2}dx$$

$$2 \int e^u du = 2e^{x/2} \Big|_0^2$$
$$2(e-1) - 2e^{-2}$$

$$e^0 = 1$$

$$\ln e = 1$$

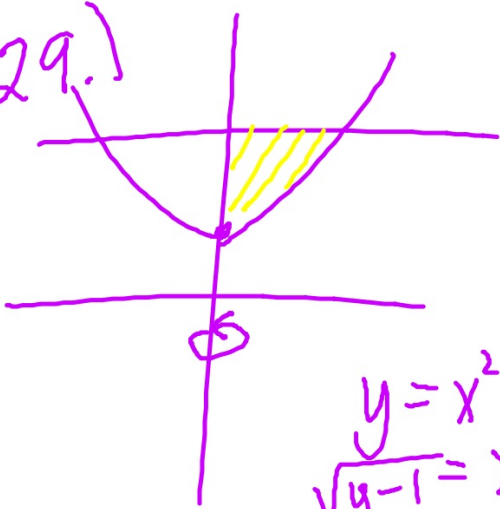
$$\ln 1 = 0$$

$$\ln 8 + \ln 6 = \ln 48$$

$$\ln 12 - \ln 2 = \ln 6$$



29.)



disk

$$y = x^2 + 1$$
$$\sqrt{y-1} = x$$

$$\pi \int_1^5 (\sqrt{y-1} - 0)^2 dy$$

$$\pi \int_1^5 (y-1) dy$$

71a.  $y = x+1$   $y = x^2-1$



$$\begin{aligned}x+1 &= x^2-1 \\x^2-x-2 &= 0 \\(x-2)(x+1) & \\x &= 2, -1\end{aligned}$$

$$\int_{-1}^2 (x-x^2+2) dx$$

$$\begin{aligned}S &= x+1-(x^2-1) \\S &= x-x^2+2\end{aligned}$$