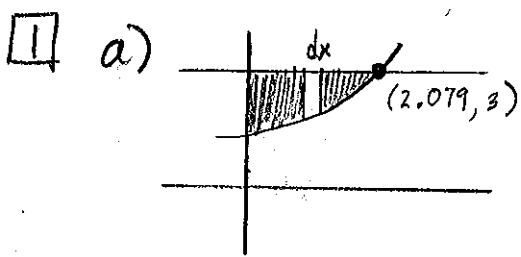
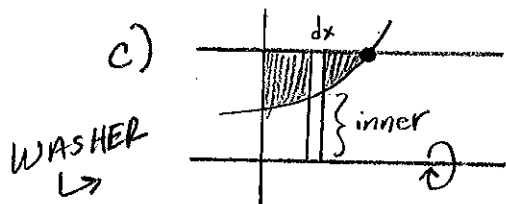


Area/Volume Review

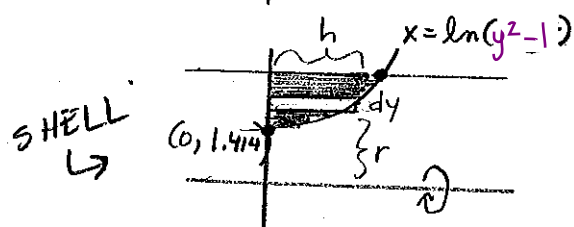


$$A = \int_0^{2.079} (3 - \sqrt{e^x + 1}) dx$$

b) $V = \int_0^{2.079} (3 - \sqrt{e^x + 1})^2 dx$



$$V = \pi \int_0^{2.079} [3^2 - (\sqrt{e^x + 1})^2] dx$$



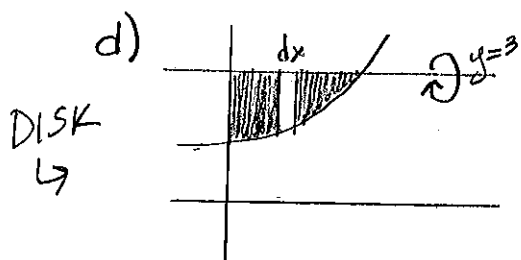
$$V = 2\pi \int_{1.414}^3 (\ln(y^2 - 1))(y) dy$$

$$y = \sqrt{e^x + 1}$$

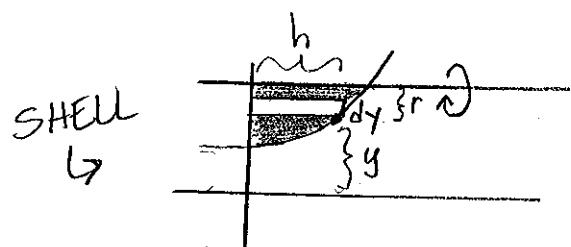
$$y^2 = e^x + 1$$

$$e^x = y^2 - 1$$

$$x = \ln(y^2 - 1)$$

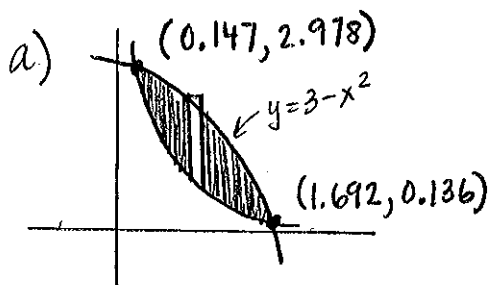


$$V = \pi \int_0^{2.079} (3 - \sqrt{e^x + 1})^2 dx$$

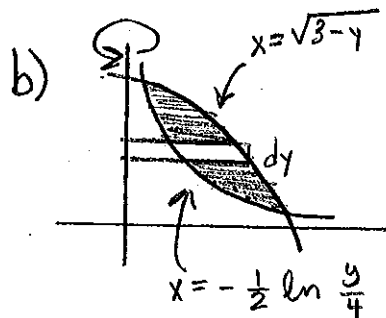


$$V = 2\pi \int_{1.414}^3 (3 - y)(\ln(1 - y^2)) dy$$

2



$$A = \int_{0.147}^{1.692} [(3-x^2) - 4e^{-2x}] dx$$

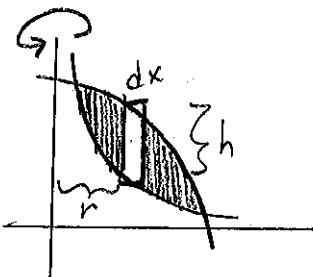


Eq 1: $y = 3 - x^2$
 $x^2 = 3 - y$
 $x = \sqrt{3 - y}$

Eq 2: $y = 4e^{-2x}$
 $\frac{y}{4} = e^{-2x}$
 $\ln \frac{y}{4} = -2x$
 $-\frac{1}{2} \ln \frac{y}{4} = x$

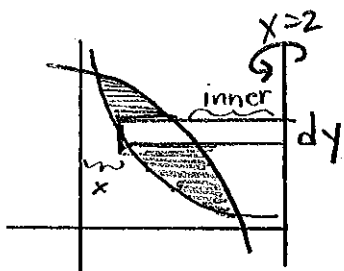
$$V = \pi \int_{0.136}^{2.978} [(\sqrt{3-y})^2 - (-\frac{1}{2} \ln \frac{y}{4})^2] dy$$

SHELL
↳



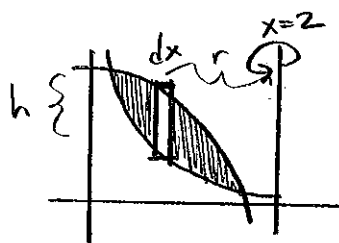
$$V = 2\pi \int_{0.147}^{1.692} x [(3-x^2) - 4e^{-2x}] dx$$

WASHER
↳



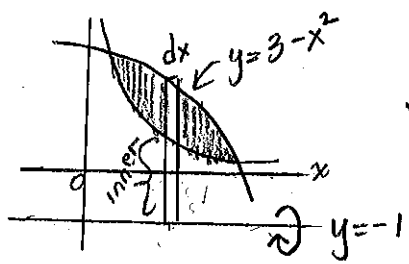
$$V = \pi \int_{0.136}^{2.978} [(2 + \frac{1}{2} \ln \frac{y}{4})^2 - (2 - \sqrt{3-y})^2] dy$$

SHELL
↳

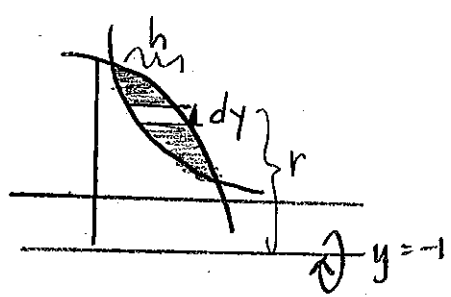


$$V = 2\pi \int_{0.147}^{1.692} (2-x)(3-x^2-4e^{-2x}) dx$$

d) WASHER ↪

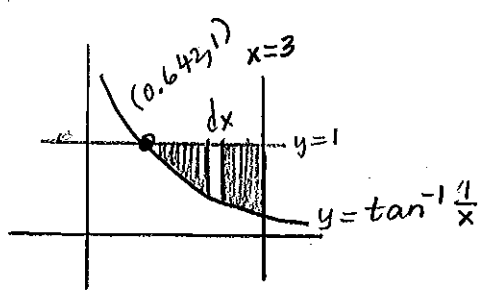


$$V = \pi \int_{0.147}^{1.692} [(4-x^2)^2 - (1+4e^{-2x})^2] dx$$



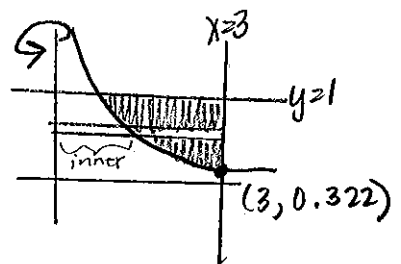
$$V = 2\pi \int_{0.136}^{2.978} (y+1) \left(\sqrt{3-y} + \frac{1}{2} \ln \frac{y}{4} \right) dy$$

[3] a)



$$A = \int_{0.642}^3 [1 - \tan^{-1}(\frac{1}{x})] dx$$

b) WASHER ↪



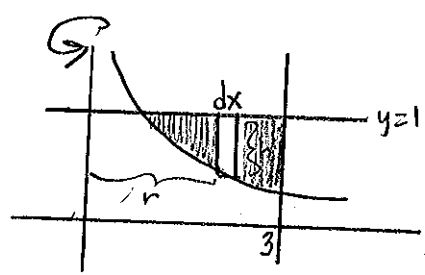
$$V = \pi \int_{0.322}^3 [3^2 - (\frac{1}{\tan y})^2] dy$$

$$y = \tan^{-1}(\frac{1}{x})$$

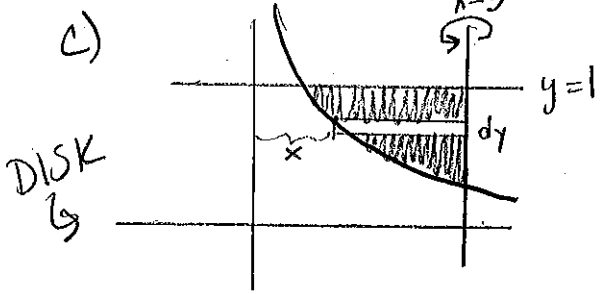
$$\tan y = \frac{1}{x}$$

$$x = \frac{1}{\tan y}$$

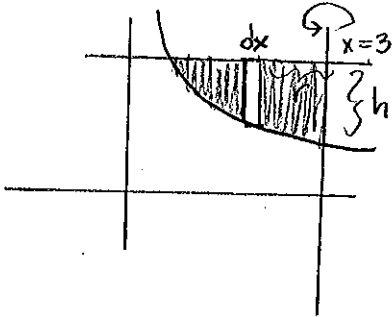
SHELL ↪



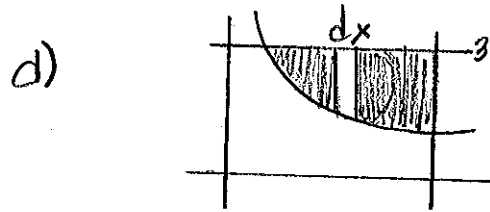
$$V = 2\pi \int_{0.642}^3 x (1 - \tan^{-1}(\frac{1}{x})) dx$$



$$V = \pi \int_{0.322}^1 \left(3 - \frac{1}{\tan y}\right)^2 dy$$

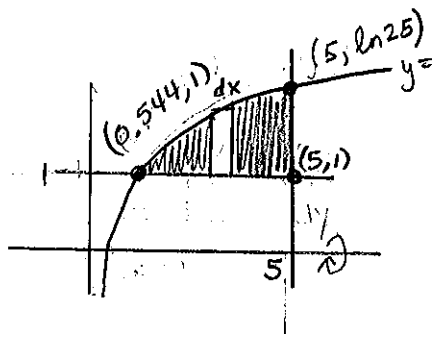


$$V = 2\pi \int_{0.642}^3 (3-x) \left(1 - \tan^{-1} \frac{1}{x}\right) dx$$



$$V = \frac{\pi}{8} \int_{0.642}^3 \left(1 - \tan^{-1} \frac{1}{x}\right)^2 dx$$

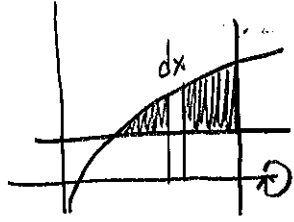
4



a) $A = \int_{0.544}^5 (\ln 5x - 1) dx$

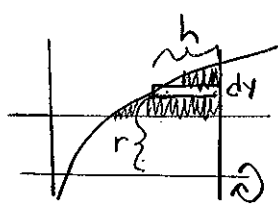
$y = \ln 5x$
 $e^y = e^{\ln 5x}$
 $\frac{1}{5} e^y = x$

b) WASHER

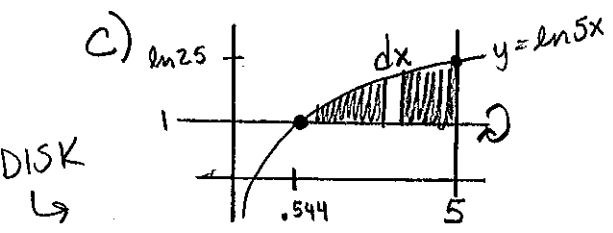


$$V = \pi \int_{0.544}^5 [(\ln 5x)^2 - 1^2] dx$$

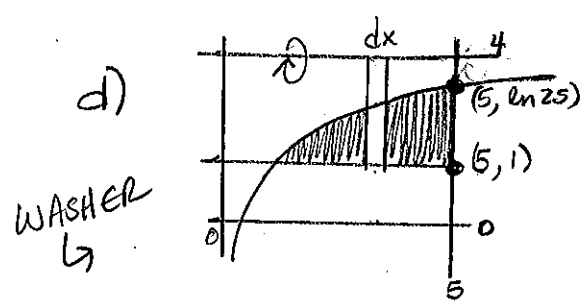
SHELL



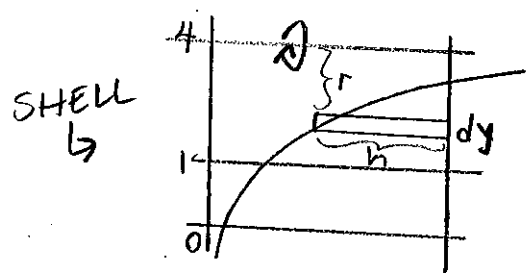
$$V = 2\pi \int_1^{\ln 25} y \left(5 - \frac{1}{5} e^y\right) dy$$



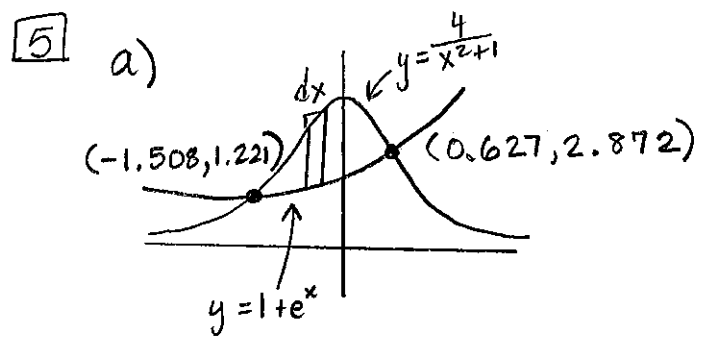
$$V = \pi \int_{.544}^5 (\ln 5x - 1)^2 dx$$



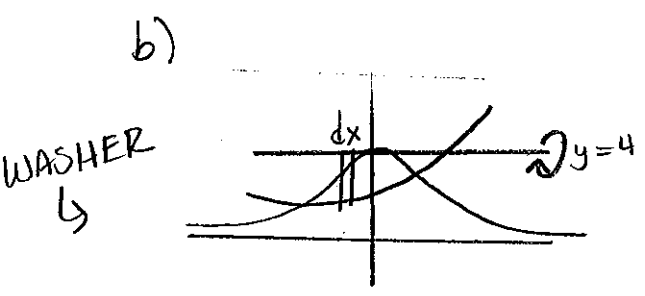
$$V = \pi \int_{.544}^5 [3^2 - (4 - \ln 5x)^2] dx$$



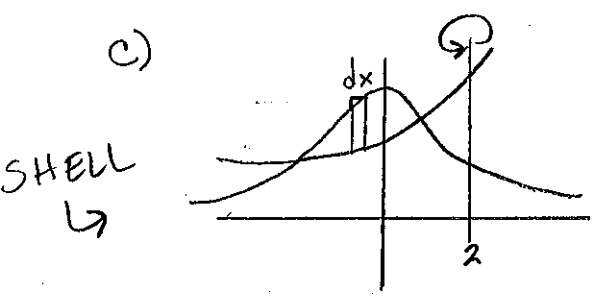
$$V = 2\pi \int_1^{\ln 25} (4 - y)(5 - \frac{1}{5}e^y) dy$$



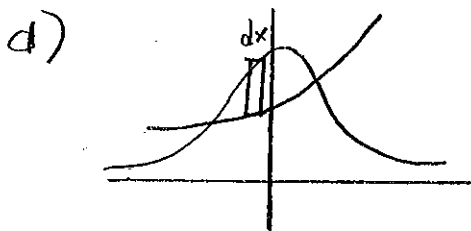
$$A = \int_{-1.508}^{0.627} \left(\frac{4}{x^2 + 1} - (1 + e^x) \right) dx$$



$$V = \pi \int_{-1.508}^{0.627} \left[(4 - (1 + e^x))^2 - \left(4 - \frac{4}{x^2 + 1} \right)^2 \right] dx$$

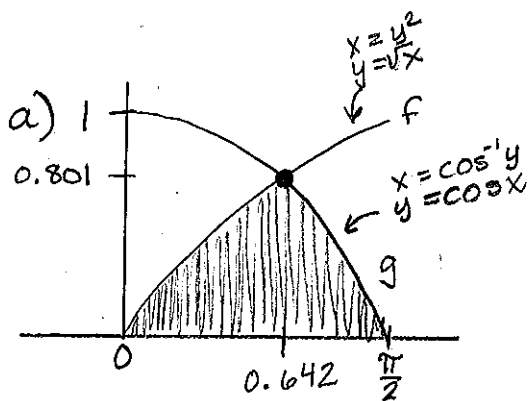


$$V = 2\pi \int_{-1.508}^{0.627} (2 - x) \left(\frac{4}{x^2 + 1} - (1 + e^x) \right) dx$$



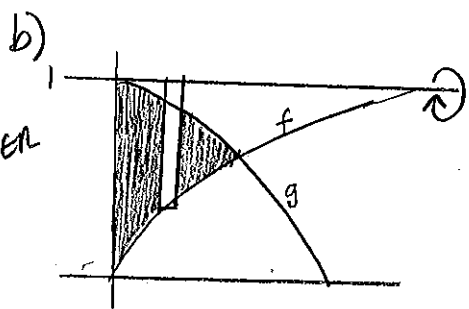
$$V = \frac{\sqrt{3}}{4} \int_{-1.508}^{0.627} \left[\frac{4}{x^2+1} - (1+e^x) \right]^2 dx$$

6

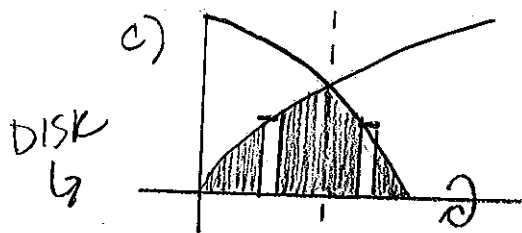


$$A = \int_0^{0.642} \sqrt{x} dx + \int_{0.642}^{\pi/2} \cos x dx$$

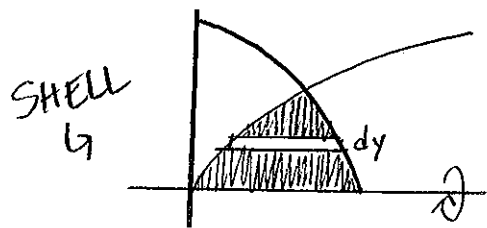
$$A = \int_0^{0.801} (\cos^{-1}y - y^2) dy$$



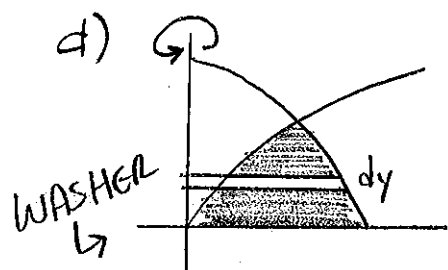
$$V = \pi \int_0^{0.642} [(1 - \sqrt{x})^2 - (1 - \cos x)^2] dx$$



$$V = \pi \int_0^{0.642} (\sqrt{x})^2 dx + \pi \int_{0.642}^{\pi/2} (\cos x)^2 dx$$



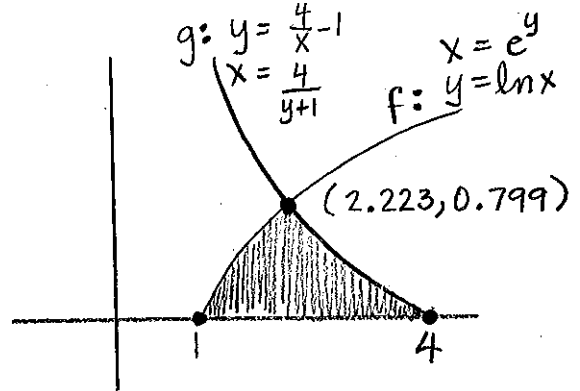
$$V = 2\pi \int_0^{0.801} y (\cos^{-1}y - y^2) dy$$



$$V = \pi \int_0^{0.801} [(\cos^{-1}y)^2 - (y^2)^2] dy$$

7

a)

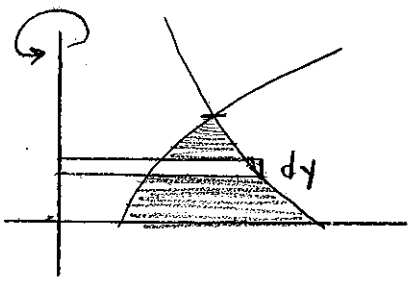


$$A = \int_1^{2.223} \ln x \, dx + \int_{2.223}^4 \left(\frac{4}{x} - 1\right) dx$$

$$A = \int_0^{0.799} \left(\frac{4}{y+1} - e^y\right) dy$$

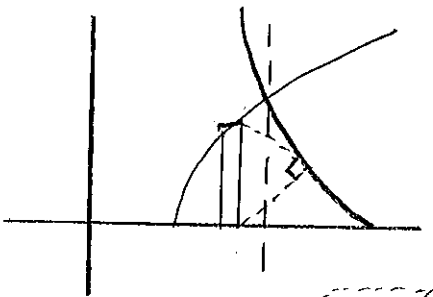
b)

WASHER
↳



$$V = \pi \int_0^{0.799} \left[\left(\frac{4}{y+1}\right)^2 - (e^y)^2 \right] dy$$

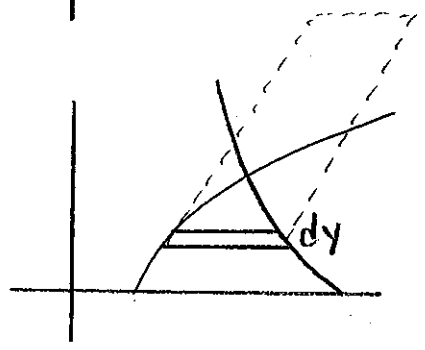
c)



isosceles right triangle: $A = \frac{1}{4} r^2$

$$V = \frac{1}{4} \int_1^{2.223} (\ln x)^2 dx + \frac{1}{4} \int_{2.223}^4 \left(\frac{4}{x} - 1\right)^2 dx$$

d)



$$V = 6 \int_0^{0.799} \left(\frac{4}{y+1} - e^y\right)^2 dy$$