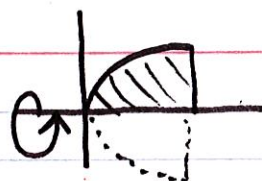
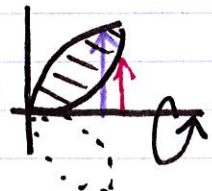


What is the formula for volume if Region is Revolved about the x-axis OR any line parallel to x-axis ($y = \text{some \#}$) if

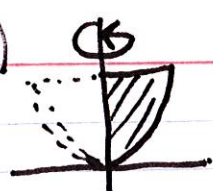
A) Solid
B) hole

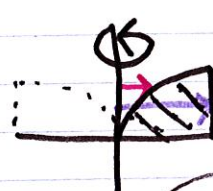
A)  $\pi \int_{x_1}^{x_2} (\text{function} - \text{LOR})^2 dx$
all in terms of x

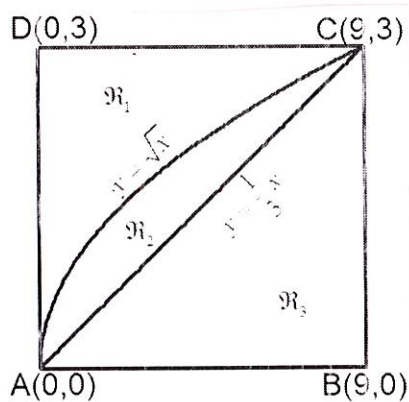
B)  $\pi \int_{x_1}^{x_2} (\text{outer function} - \text{LOR})^2 - (\text{inner function} - \text{LOR})^2 dx$
all in terms of x

What is the formula for volume if Region is Revolved about the y-axis OR any line parallel to y-axis ($x = \text{some \#}$) if

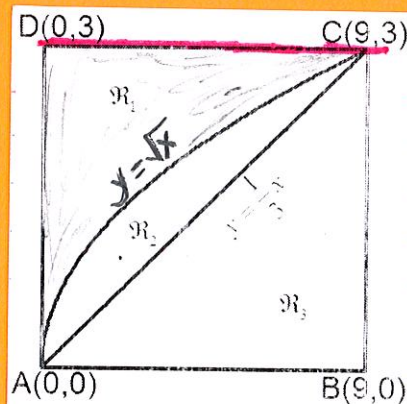
A) solid
B) hole

A.)  $\pi \int_{y_1}^{y_2} (\text{function} - \text{LOR})^2 dy$
all in terms of y

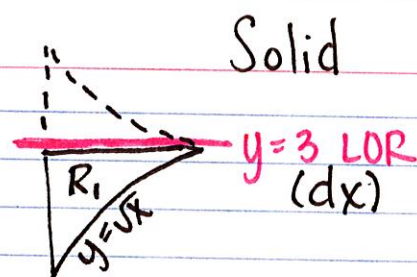
B.)  all in terms of y
 $\pi \int_{y_1}^{y_2} (\text{outer function} - \text{LOR})^2 - (\text{inner function} - \text{LOR})^2 dy$



Find Volume if you Rotate R_1 about DC



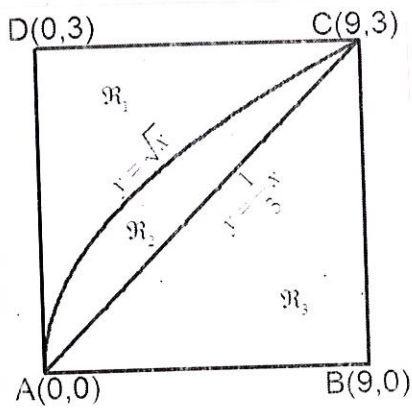
Find Volume if you Rotate R_1 about DC



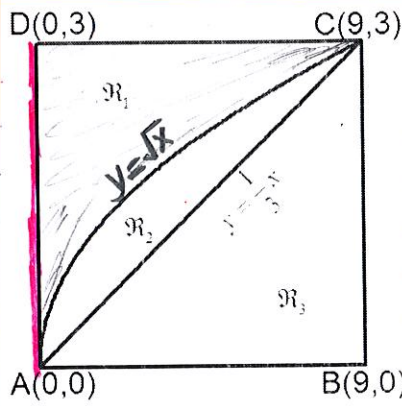
$$\pi \int_{x_1}^{x_2} (\text{function} - \text{LOR})^2 dx$$

$$\pi \int_0^9 (\sqrt{x} - 3)^2 dx$$

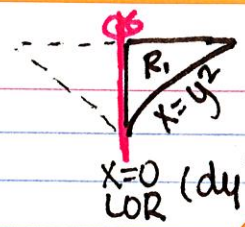
$$\frac{27\pi}{2}$$



Find Volume if you Rotate R_1 about AD



Find Volume if you Rotate R_1 about AD



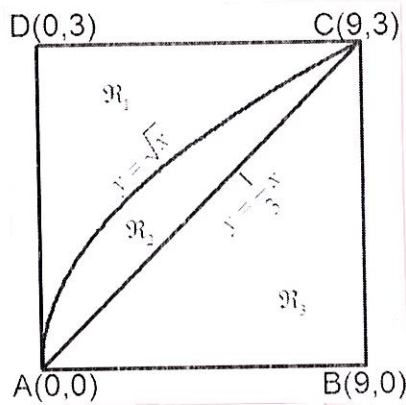
Solid

$x=0$ (dy)
LOR

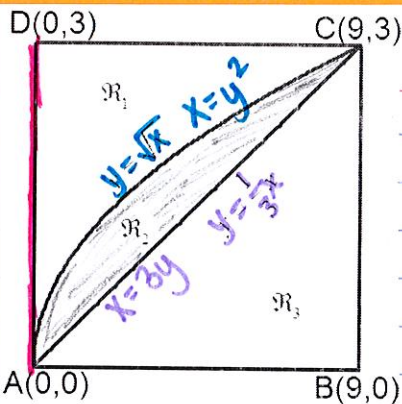
$$\pi \int_0^3 (y^2 - 0)^2 dy$$

$$\pi \int_0^3 (y^2 - 0)^2 dy$$

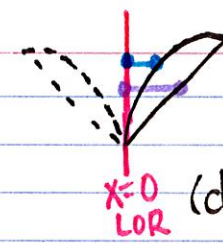
$$\frac{243\pi}{5}$$



Find the Volume if you Rotate R_2 about AD



Find the Volume if you Rotate R_2 about AD



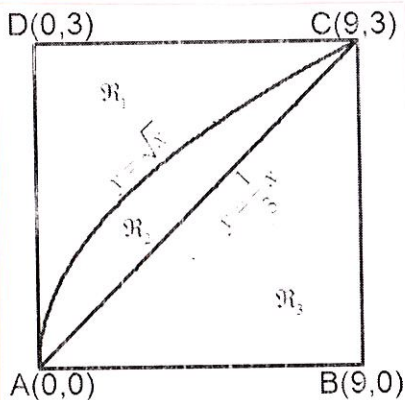
hole

$x=0$ (dy)
LOR

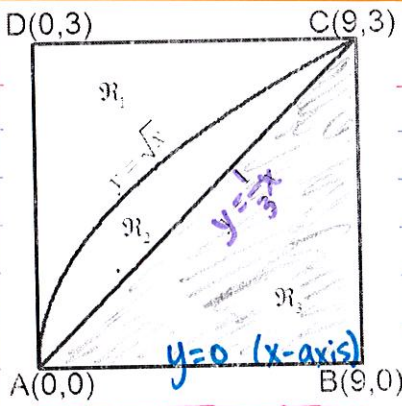
$$\pi \int_0^3 (\text{outer function} - \text{LOR})^2 - (\text{inner function} - \text{LOR})^2 dy$$

$$\pi \int_0^3 (3y - 0)^2 - (y^2 - 0)^2 dy$$

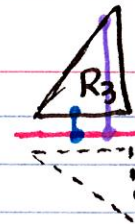
$$\frac{162\pi}{5}$$



Find Volume if you Rotate R_3 about $y = -1$



Find Volume if you Rotate R_3 about $y = -1$



hole

$y = -1$ (dx)
LOR

$$\pi \int_0^9 (\text{outer function} - \text{LOR})^2 - (\text{inner function} - \text{LOR})^2 dx$$

$$\pi \int_0^9 (\frac{1}{3}x - (-1))^2 - (0 - (-1))^2 dx$$

$$\pi \int_0^9 (\frac{1}{3}x + 1)^2 - (1)^2 dx$$

$$54\pi$$