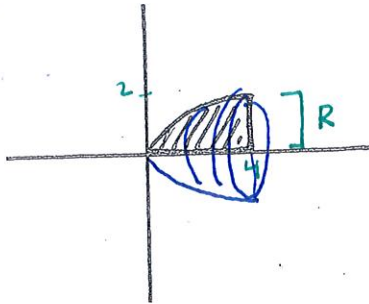


For problems 1- 10, set up definite integral that represents each volume. For 11-12, represent area.

1. Rotate about x-axis

$y = x^{1/2}, y = 0, x = 4$



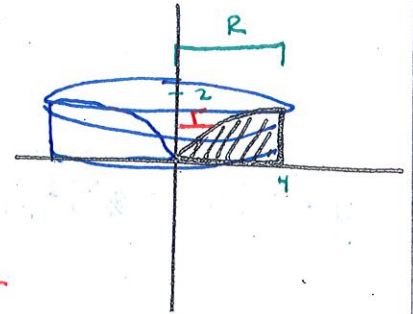
R:  $x^{1/2} - 0$

r: —

Volume =  $\pi \int_0^4 (x^{1/2})^2 dx = 25.133$

2. Rotate about y - axis

$y = x^{1/2}, y = 0, x = 4$



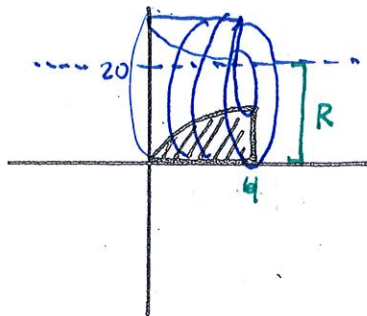
R:  $4 - 0 = 4$

r:  $y^2 - 0 = y^2$

Volume =  $\pi \int_0^2 (4)^2 - (y^2)^2 dy = 80.425$

3. Rotate about y = 20

$y = x^{1/2}, y = 0, x = 4$



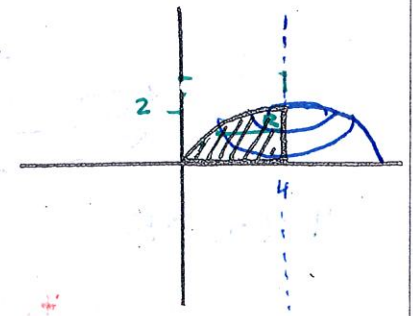
R:  $20 - 0 = 20$

r:  $20 - x^{1/2}$

Volume =  $\pi \int_0^4 (20)^2 - (20 - x^{1/2})^2 dx = 645.074$

4. Rotate about x = 4

$y = x^{1/2}, y = 0, x = 4$



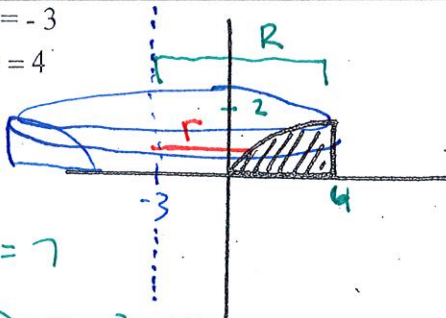
R:  $4 - y^2$

r: —

Volume =  $\pi \int_0^2 (4 - y^2)^2 dy = 53.617$

5. Rotate about x = -3

$y = x^{1/2}, y = 0, x = 4$



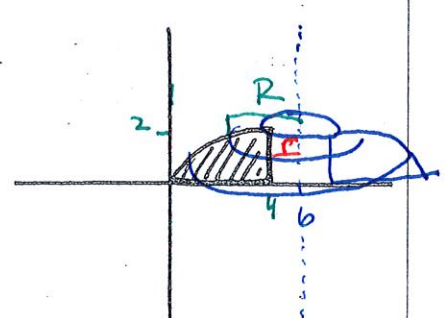
R:  $4 - (-3) = 7$

r:  $y^2 - (-3) = y^2 + 3$

Volume =  $\pi \int_0^2 (7)^2 - (y^2 + 3)^2 dy = 180.956$

6. Rotate about x = 6

$y = x^{1/2}, y = 0, x = 4$



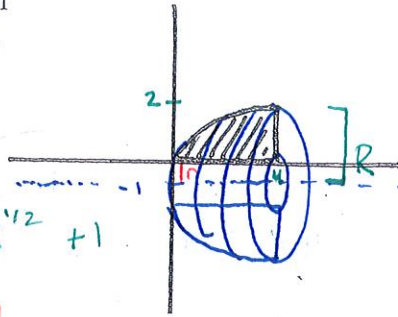
R:  $6 - y^2$

r:  $6 - 4 = 2$

Volume =  $\pi \int_0^2 (6 - y^2)^2 - (2)^2 dy = 120.637$

7. Rotate about  $y = -1$

$y = x^{1/2}$ ,  $y = 0$ ,  $x = 4$



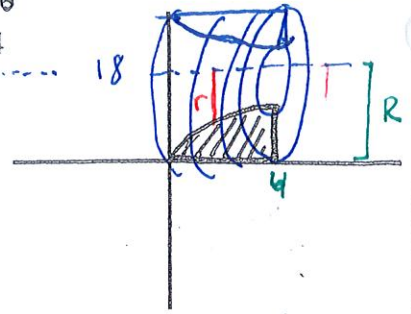
$R: x^{1/2} - (-1) = x^{1/2} + 1$

$r: 0 - (-1) = 1$

Volume =  $\pi \int_0^4 (x^{1/2} + 1)^2 - (1)^2 dx = 58.643$

8. Rotate about  $y = 18$

$y = x^{1/2}$ ,  $y = 0$ ,  $x = 4$



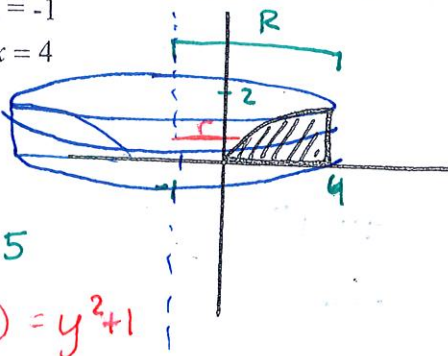
$R: 18 - 0 = 18$

$r: 18 - x^{1/2}$

Volume =  $\pi \int_0^4 (18)^2 - (18 - x^{1/2})^2 dx = 578.053$

9. Rotate about  $x = -1$

$y = x^{1/2}$ ,  $y = 0$ ,  $x = 4$



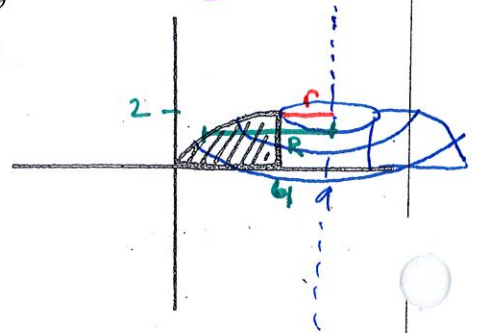
$R: 4 - (-1) = 5$

$r: y^2 - (-1) = y^2 + 1$

Volume =  $V = \pi \int_0^2 (5)^2 - (y^2 + 1)^2 dy = 113.935$

10. Rotate about  $x = 9$

$y = x^{1/2}$ ,  $y = 0$ ,  $x = 4$



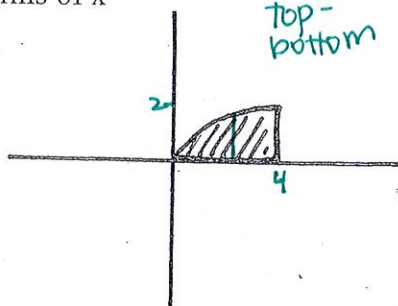
$R: 9 - y^2$

$r: 9 - 4 = 5$

Volume =  $V = \pi \int_0^2 (9 - y^2)^2 - (5)^2 dy = 221.168$

11. Find the area in terms of x

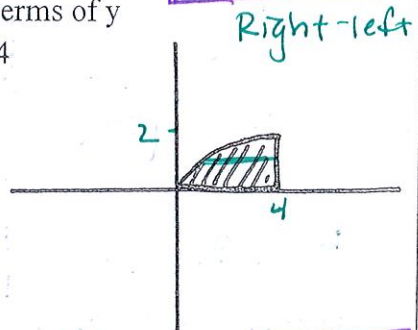
$y = x^{1/2}$ ,  $y = 0$ ,  $x = 4$



Area =  $\int_0^4 x^{1/2} dx = 5.333$

12. Find the area in terms of y

$y = x^{1/2}$ ,  $y = 0$ ,  $x = 4$



Area =  $\int_0^2 (4 - y^2) dy = 5.333$