

1. $V = \pi \int_0^1 [(x+1) - 0]^2 dx$
 $V = \frac{11\pi}{3} \approx 11.51$

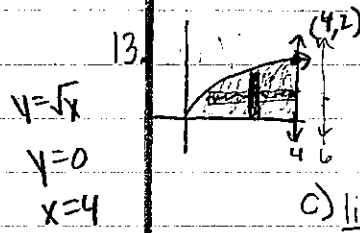
3. $V = \pi \int_0^2 (\sqrt{4-x^2} - 0)^2 dx$
 $V = \frac{16\pi}{3} \approx 16.755$

5. $V = \pi \int_0^4 (\sqrt{x} - 0)^2 dx$
 $V = \frac{15\pi}{2} \approx 23.56$

7. $V = \pi \int_0^1 [(x^2 - 0)^2 - (x^3 - 0)^2] dx$
 $V = \frac{2\pi}{35} \approx 0.1795$

9. $V = \pi \int_0^4 (\sqrt{y} - 0)^2 dy$ $y = x^2$
 $V = 8\pi \approx 25.133$ $\sqrt{y} = x$

11. $V = \pi \int_0^1 (y^{3/2} - 0)^2 dy$ $y = x^{4/3}$
 $V = \frac{\pi}{4} \approx 0.785$ $y^{3/2} = x$

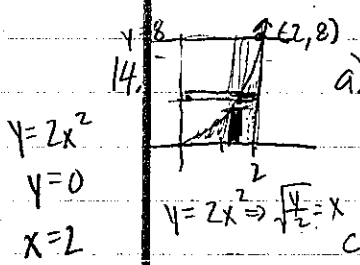


a) x-axis: $V = \pi \int_0^4 (\sqrt{x} - 0)^2 dx$
 $V = 8\pi \approx 25.133$

b) y-axis: $V = \pi \int_0^2 [(4 - y^2)^2 - (y^2 - 0)^2] dy$
 $y = \sqrt{x} \Rightarrow x = y^2$ $V = \frac{128\pi}{5} \approx 80.425$

c) line $x = 4$: $V = \pi \int_0^2 (4 - y^2)^2 dy$
 $V = \frac{256\pi}{15} \approx 53.617$

d) line $x = 6$: $V = \pi \int_0^2 [(6 - y^2)^2 - (6 - 4)^2] dy$
 $V = \frac{192\pi}{5} \approx 120.637$

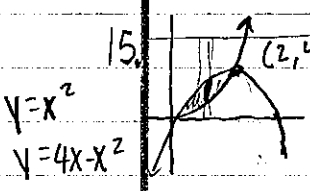


a) y-axis: $V = \pi \int_0^2 [(2 - 0)^2 - (\sqrt{2} - 0)^2] dy$
 $V = 16\pi \approx 50.265$

b) x-axis: $V = \pi \int_0^2 (2x^2 - 0)^2 dx$
 $V = \frac{128\pi}{5} \approx 80.425$

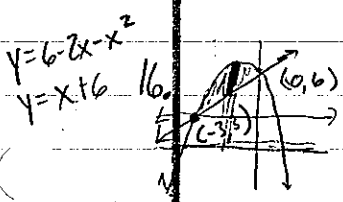
c) line $y = 8$: $V = \pi \int_0^2 [(8 - 0)^2 - (8 - 2x^2)^2] dx$
 $V = \frac{896\pi}{15} \approx 187.658$

d) line $x = 2$: $V = \pi \int_0^8 (2 - \sqrt{\frac{y}{2}})^2 dy$
 $V \approx 5.333\pi \approx 16.755$



a) x-axis: $V = \pi \int_0^2 [(4x - x^2) - 0]^2 - (x^2 - 0)^2 dx$
 $V = \frac{32\pi}{3} \approx 33.510$

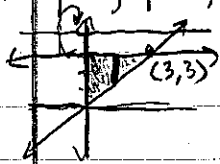
b) line $y = 6$: $V = \pi \int_0^2 [(6 - x^2)^2 - (6 - (4x - x^2))^2] dx$
 $V = \frac{64\pi}{3} \approx 67.021$



a) x-axis: $V = \pi \int_{-3}^0 [(6 - 2x - x^2) - 0]^2 - (x + 6 - 0)^2 dx$
 $V = \frac{243\pi}{5} \approx 152.681$

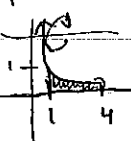
b) line $y = 3$: $V = \pi \int_{-3}^0 [(6 - 2x - x^2) - 3]^2 - (x + 6 - 3)^2 dx$
 $V = \frac{108\pi}{5} \approx 67.858$

17. $y=x, y=3, x=0$ $V = \pi \int_0^3 [(4-x)^2 - (4-3)^2] dx$



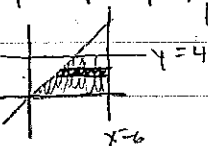
$V = 18\pi \approx 56.549$

19. $y = \frac{1}{x}, y=0, x=1, x=4$ $V = \pi \int_1^4 [(4-0)^2 - (4-\frac{1}{x})^2] dx$



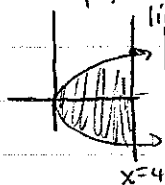
$V \approx 10.3404\pi \approx 32.485$

21. $y=x, y=0, y=4, x=6$ $V = \pi \int_0^4 (6-y)^2 dy$



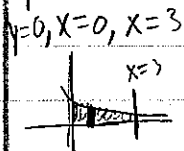
$V = \frac{208\pi}{3} \approx 217.817$

23. $x=y^2, x=4$ $V = \pi \int_{-2}^2 [(6-y^2)^2 - (6-4)^2] dy$



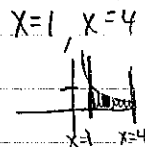
$V = \frac{384\pi}{5} \approx 241.274$

25. $y = \sqrt{x+1}, x\text{-axis}$ $V = \pi \int_0^3 (\frac{1}{\sqrt{x+1}} - 0)^2 dx$



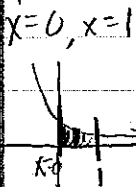
$V \approx 1.386\pi \approx 4.355$

27. $y = \frac{1}{x}, y=0$ $V = \pi \int_1^4 (\frac{1}{x} - 0)^2 dx$



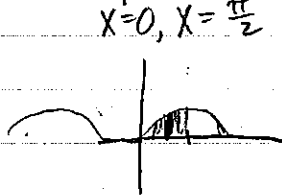
$V \approx \frac{3\pi}{4} \approx 2.356$

29. $y = e^{-x}, y=0$ $V = \pi \int_0^1 (e^{-x} - 0)^2 dx$

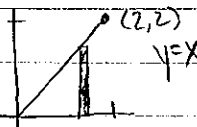


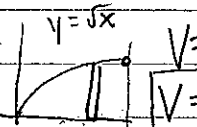
$V \approx .432\pi \approx 1.358$

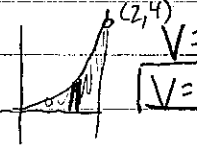
31. $y = \sqrt{\sin x}, y=0$ $V = \pi \int_0^{\frac{\pi}{2}} (\sqrt{\sin x} - 0)^2 dx$

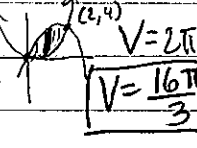


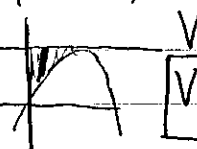
$V = \pi \approx 3.142$

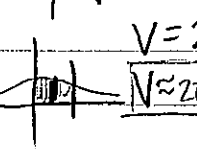
1.  $V = 2\pi \int_0^2 (x-0)(x-0) dx = 3$
 $V = \frac{16\pi}{3} \approx 8.378$

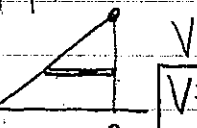
 $V = 2\pi \int_0^4 (x-0)(\sqrt{x}-0) dx$
 $V = \frac{128\pi}{5} \approx 80.425$
 $2\pi \cdot 12.7995$


5. $y = x^2$
 $y = 0$
 $x = 2$
 $V = 2\pi \int_0^2 (x-0)(x^2-0) dx$
 $V = 8\pi \approx 25.133$

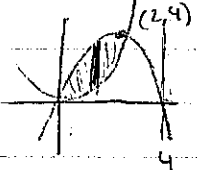
7. $y = x^2$
 $y = 4x - x^2$
 $x(4-x)$
 $V = 2\pi \int_0^2 (x-0)((4x-x^2)-x^2) dx$
 $V = \frac{16\pi}{3} \approx 16.755$

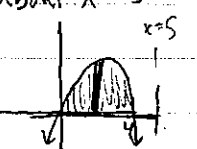
9. $y = 4x - x^2, x=0, y=4$
 $V = 2\pi \int_0^2 (x-0)(4-(4x-x^2)) dx$
 $V = \frac{8\pi}{3} \approx 8.378$

11. $y = \frac{1}{\sqrt{2\pi}} e^{-x^2/2}, y=0, x=0, x=1$
 $V = 2\pi \int_0^1 (x-0) \left(\frac{1}{\sqrt{2\pi}} e^{-x^2/2} - 0 \right) dx$
 $V \approx 2\pi \cdot 1.57 \approx 9.86$

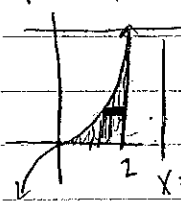
13. $y = x$
 $V = 2\pi \int_0^2 (y-0)(2-y) dy$
 $V = \frac{8\pi}{3} \approx 8.378$

15. $y = \frac{1}{x}, x=1, x=2, y=0$ disc method
 $V = \pi \int_1^2 \left(\frac{1}{x} - 0 \right)^2 dx$
 $V \approx \frac{\pi}{2} \approx 1.571$

17. $y = x^2, y = 4x - x^2$
 about $x = 4$
 $V = 2\pi \int_0^2 (4-x)((4x-x^2)-x^2) dx$
 $V = 16\pi \approx 50.265$

19. $y = 4x - x^2, y = 0$
 about $x = 5$
 $V = 2\pi \int_0^4 (5-x)((4x-x^2)-0) dx$
 $V = 64\pi \approx 201.062$

21. $y=x^3, y=0, x=2$



a) x-axis

$$V = 2\pi \int_0^8 (y-0)(2-\sqrt[3]{y}) dy$$

$$V = \frac{128\pi}{7} \approx 57.446$$

b) y-axis

$$V = 2\pi \int_0^2 (x-0)(x^3-0) dx$$

$$V = \frac{64\pi}{5} \approx 40.212$$

c) line $x=4$

$$V = 2\pi \int_0^2 (4-x)(x^3-0) dx$$

$$V = \frac{96\pi}{5} \approx 60.319$$

d) line $y=8$

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

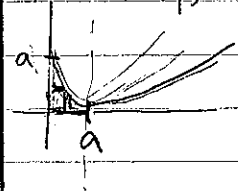
$$V \approx 143.616\pi \approx 143.616$$

23. $x^{1/2} + y^{1/2} = a^{1/2}, x=0, y=0$

$$y^{1/2} = a^{1/2} - x^{1/2}$$

$$y = (\sqrt{a} - \sqrt{x})^2$$

$$x = (\sqrt{a} - \sqrt{y})^2$$



a) x-axis

$$V = 2\pi \int_0^a (y-0)(\sqrt{a}-\sqrt{y})^2 dy$$

$$V = 2\pi \int_0^a y(a-2\sqrt{a}\sqrt{y}+y) dy$$

$$V = 2\pi \int_0^a (ay - 2\sqrt{a}y^{3/2} + y^2) dy$$

$$V = 2\pi \left[\frac{ay^2}{2} - 2\sqrt{a} \cdot \frac{2}{5} y^{5/2} + \frac{1}{3} y^3 \right] \Big|_0^a$$

$$V = 2\pi \left[\frac{a^3}{2} - \frac{4\sqrt{a}}{5} \cdot a^{5/2} + \frac{1}{3} a^3 \right] - [0]$$

$$V = 2\pi \left[\frac{a^3}{2} - \frac{4}{5} a^3 + \frac{a^3}{3} \right]$$

$$V = 2\pi \left[\frac{15a^3}{30} - \frac{24a^3}{30} + \frac{10a^3}{30} \right]$$

$$V = \pi \left[\frac{a^3}{15} \right]$$

$$V = \frac{\pi a^3}{15}$$

b) y-axis

$$V = 2\pi \int_0^a (x-0)(\sqrt{a}-\sqrt{x})^2 dx$$

$$V = \frac{\pi a^3}{15}$$

c) line $x=a$

$$V = 2\pi \int_0^a (a-x)(\sqrt{a}-\sqrt{x})^2 dx$$

$$V = 2\pi \int_0^a (a-x)(a-2\sqrt{a}\sqrt{x}+x) dx$$

$$V = 2\pi \int_0^a (a^2 - 2a\sqrt{a}\sqrt{x} + ax - ax + 2x\sqrt{a}\sqrt{x} - x^2) dx$$

$$V = 2\pi \left[a^2x - 2a^{3/2} \cdot \frac{2}{3} x^{3/2} + 2a^{1/2} \cdot \frac{2}{5} x^{5/2} - \frac{1}{3} x^3 \right] \Big|_0^a$$

$$V = 2\pi \left[a^3 - \frac{4}{3} a^3 + \frac{4}{5} a^3 - \frac{1}{3} a^3 \right]$$

$$V = 2\pi \left[\frac{15a^3 - 20a^3 + 12a^3 - 5a^3}{15} \right]$$

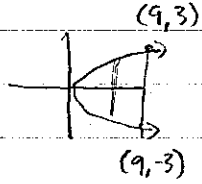
$$V = \frac{4\pi a^3}{15}$$

d) line $y=a$

similar to c but w/ y & dy

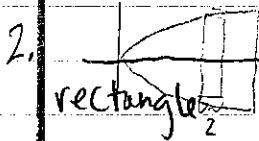
$$V = \frac{4\pi a^3}{15}$$

1. $x=y^2, x=9$
 $y = \pm\sqrt{x}$
square



$$V = \int_0^9 (\sqrt{x} - (-\sqrt{x}))^2 dx$$

$$V = 162$$



$$V = \int_0^9 (\sqrt{x} - (-\sqrt{x}))(2) dx$$

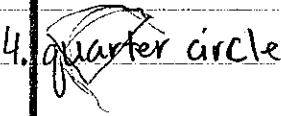
$$V = 72$$



$$V = \frac{\pi}{2} \int_0^9 \left(\frac{1}{2}(\sqrt{x} - (-\sqrt{x}))\right)^2 dx$$

$$V = \frac{81\pi}{4}$$

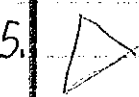
$$\approx 63.617$$



$$V = \frac{\pi}{4} \int_0^9 (\sqrt{x} - (-\sqrt{x}))^2 dx$$

$$V = \frac{81\pi}{2}$$

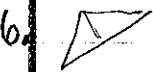
$$\approx 127.235$$



$$V = \frac{\sqrt{3}}{4} \int_0^9 (\sqrt{x} - (-\sqrt{x}))^2 dx$$

$$V = \frac{81\sqrt{3}}{2}$$

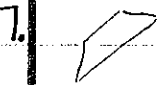
$$\approx 70.148$$



$$V = \frac{1}{2} \int_0^9 (\sqrt{x} - (-\sqrt{x})) \left(\frac{1}{4}(\sqrt{x} - (-\sqrt{x}))\right) dx$$

$$V = \frac{81}{4}$$

$$= 20.25$$



$$V = \frac{1}{2} \int_0^9 \left[(\sqrt{x} - (-\sqrt{x})) + \frac{1}{2}(\sqrt{x} - (-\sqrt{x})) \right] \left[\frac{1}{4}(\sqrt{x} - (-\sqrt{x})) \right] dx$$

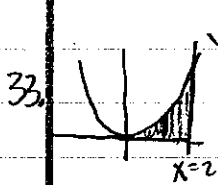
$$\frac{1}{2} \int_0^9 (2\sqrt{x} + \sqrt{x}) \left(\frac{1}{2}\sqrt{x}\right) dx$$

$$V = \frac{243}{8}$$

$$= 30.375$$

$$\frac{1}{2}(b_1+b_2)h$$

Section 7.3 (cont.)
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$$V = 2\pi \int_0^2 (x-0)(x^2-0) dx$$

$$V = 2\pi \int_0^2 (x^3) dx$$

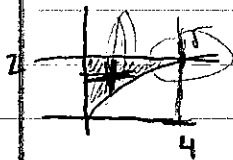
$$V = 2\pi \cdot \frac{1}{4} x^4 \Big|_0^2$$

$$V = \frac{\pi}{2} (2^4)$$

$$V = 8\pi$$

(35 over)

35. $y = \sqrt{x}$, $y = 2$, $x = 0$



$x = y^2$

a) x-axis

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

$$V = \pi \int_0^4 [4-x] dx$$

$$V = \pi [4x - \frac{1}{2}x^2] \Big|_0^4$$

$$V = \pi [16 - 8]$$

$$\boxed{V = 8\pi}$$

b) y-axis

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

$$V = \pi \int_0^2 y^4 dy$$

$$V = \pi \cdot \frac{1}{5} y^5 \Big|_0^2$$

$$\boxed{V = \frac{32\pi}{5}}$$

c) line $y = 2$

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

$$V = \pi \int_0^4 (4 - 4\sqrt{x} + x) dx$$

$$V = \pi (4x - \frac{8}{3}x^{3/2} + \frac{1}{2}x^2) \Big|_0^4$$

$$V = \pi (16 - \frac{64}{3} + 8)$$

$$\boxed{V = \frac{8\pi}{3}}$$

d) line $x = 4$

$$V = \pi \int_0^2 [(4-0)^2 - (4-y^2)^2] dy$$

$$V = \pi \int_0^2 [16 - (16 - 8y^2 + y^4)] dy$$

$$V = \pi \int_0^2 [8y^2 - y^4] dy$$

$$V = \pi [\frac{8}{3}y^3 - \frac{1}{5}y^5] \Big|_0^2$$

$$V = \pi [\frac{64}{3} - \frac{32}{5}]$$

$$\boxed{V = \frac{224\pi}{15}}$$