

Set up the integrals for #1-7 odds. Do not calculate the volume.

Set up and calculate the volume from #2-8 evens, 9-12 all.

1.  $y = \sqrt{4-x}$ ,  $x = 0$ ,  $y = 0$  about :

a) x - axis

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

OR

$$\int_0^2 2\pi y \left( (4-y^2) - (0) \right) dy$$

b) y - axis

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

OR

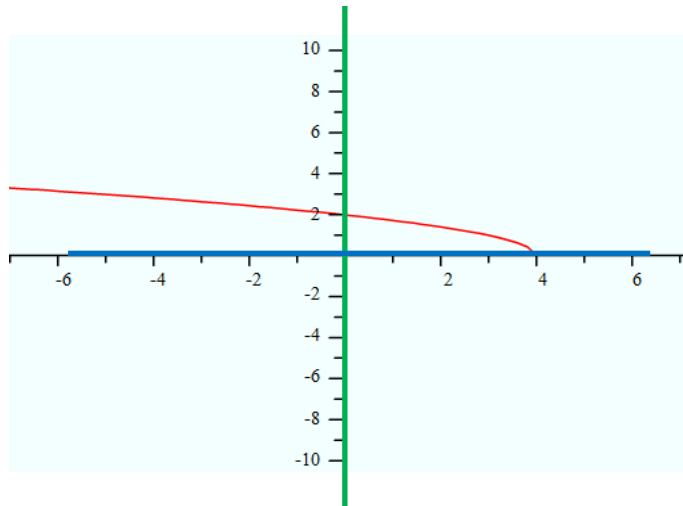
$$\int_0^2 \pi \left( (4-y^2)^2 - (0)^2 \right) dy$$

c)  $y = 3$

$$\int_0^4 \pi \left( (3-0)^2 - (3-\sqrt{4-x})^2 \right) dx$$

OR

$$\int_0^2 2\pi(3-y) \left( (4-y^2) - (0) \right) dy$$

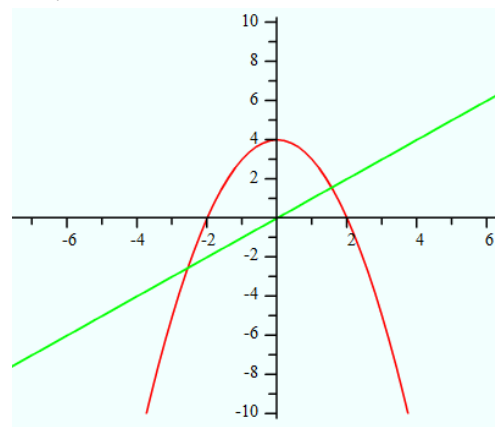


2.  $y = \sqrt{4-x^2}$ ,  $y = x$  and  $x = 0$

$$\int_0^{1.414} 2\pi x \left( (\sqrt{4-x^2}) - (x) \right) dx$$

4.907

about the y-axis



3.  $y = 3x^2 + 1$ ,  $y = 4$  about :

a) x - axis

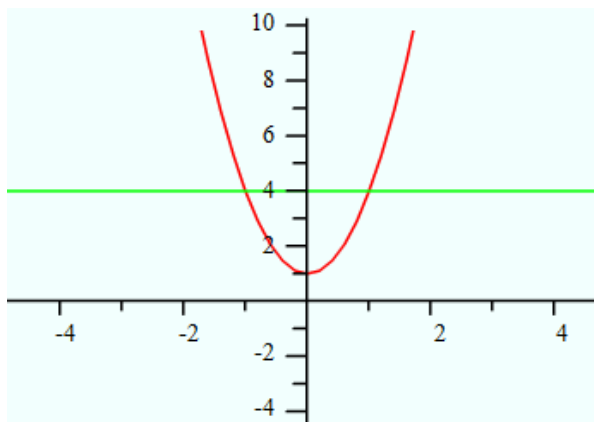
$$\int_{-1}^1 \pi \left( (4)^2 - (3x^2 + 1)^2 \right) dx$$

b)  $y = 4$

$$\int_{-1}^1 \pi \left( (4 - (3x^2 + 1))^2 - (4 - 4)^2 \right) dx$$

c)  $y = 6$

$$\int_{-1}^1 \pi \left( (6 - (3x^2 + 1))^2 - (6 - 4)^2 \right) dx$$

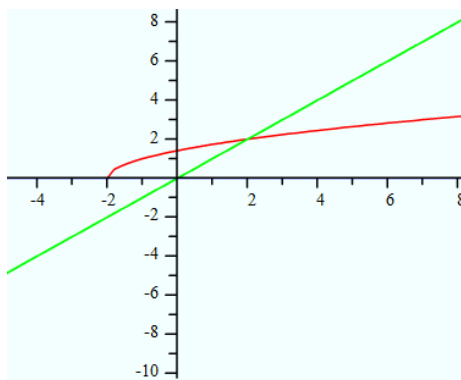


4.  $y = \sqrt{x+2}$ ,  $y = x$  and  $y = 0$

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

37.699

about the line  $y = -1$



5.  $y = x^2$ ,  $x = 2$ ,  $y = 0$  about :

a) x - axis

$$\int_0^2 \pi \left( (x^2)^2 - (0)^2 \right) dx$$

OR

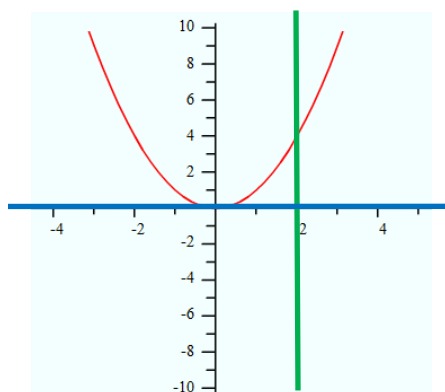
$$\int_0^4 2\pi y (2 - \sqrt{y}) dy$$

b) y - axis

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

OR

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



c)  $x = 2$

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

OR

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

d)  $x = -1$

$$\int_0^2 2\pi(x-(-1))(x^2-0) dx$$

OR

$$\int_0^4 \pi \left( (2-(-1))^2 - (\sqrt{y}-(-1))^2 \right) dy$$

e)  $y = -1$

$$\int_0^2 \pi \left( (x^2-(-1))^2 - (0-(-1))^2 \right) dx$$

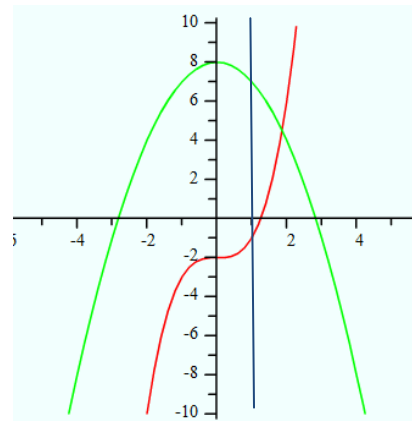
OR

$$\int_0^4 2\pi(y-(-1))(2-(\sqrt{y})) dy$$

6.  $y = x^3 - 2$   $y = -x^2 + 8$  and  $x = 1$  about the line  $x = 5$

$$\int_1^{1.867} 2\pi(5-x)((-x^2+8)-(x^3-2)) dx$$

93.8



7.  $y = x^3$ ,  $y = 1$ ,  $x = 0$  about :

a)  $x = 2$

$$\int_0^1 2\pi(2-x)(1-x^3) dx$$

OR

$$\int_0^1 \pi \left( (2-0)^2 - (2-\sqrt[3]{y})^2 \right) dy$$

b)  $x = -2$

$$\int_0^1 2\pi(x-(-2))(1-x^3) dx$$

OR

$$\int_0^1 \pi \left( (\sqrt[3]{y}-(-2))^2 - (0-(-2))^2 \right) dy$$

c)  $y = 2$

$$\int_0^1 \pi \left( (2-x^3)^2 - (2-1)^2 \right) dx$$

OR

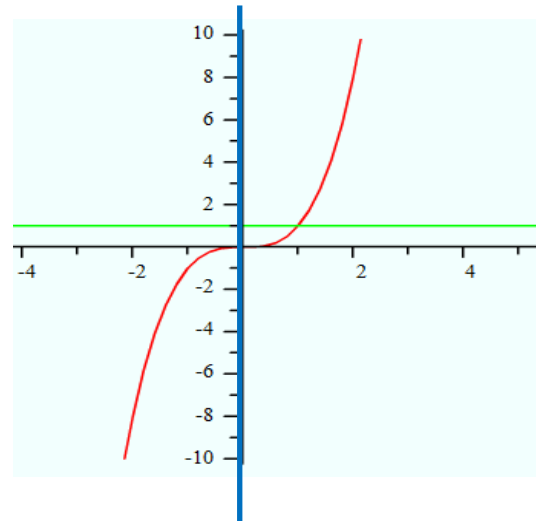
$$\int_0^1 2\pi(2-y) \left( (\sqrt[3]{y}) - (0) \right) dy$$

d)  $y = -2$

$$\int_0^1 \pi \left( (1-(-2))^2 - (x^3-(-2))^2 \right) dx$$

OR

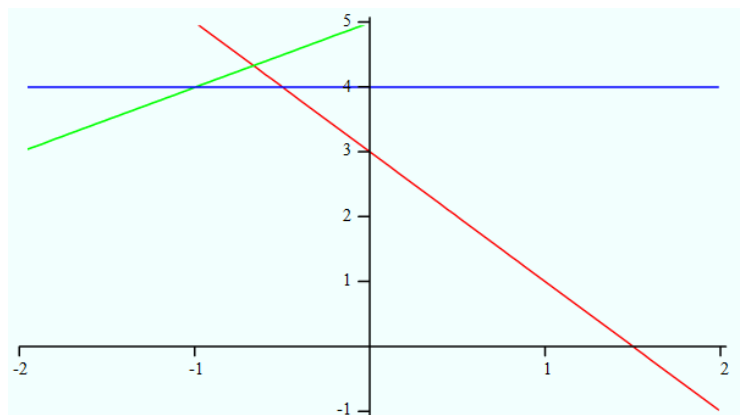
$$\int_0^1 2\pi(y-(-2)) \left( (\sqrt[3]{y}) - (0) \right) dy$$



8.  $y = -2x + 3$ ,  $y = x + 5$  and  $y = 4$  about the line  $x = 6$

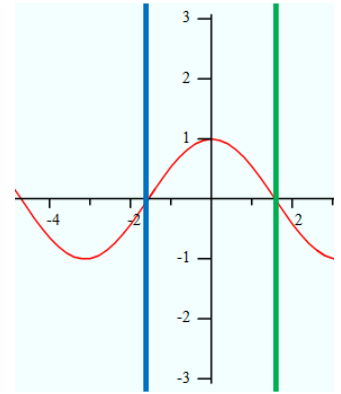
$$\int_4^{4.333} \pi \left( (6-(y-5))^2 - \left( 6 - \left( -\frac{1}{2}y + \frac{3}{2} \right) \right)^2 \right) dy$$

3.52



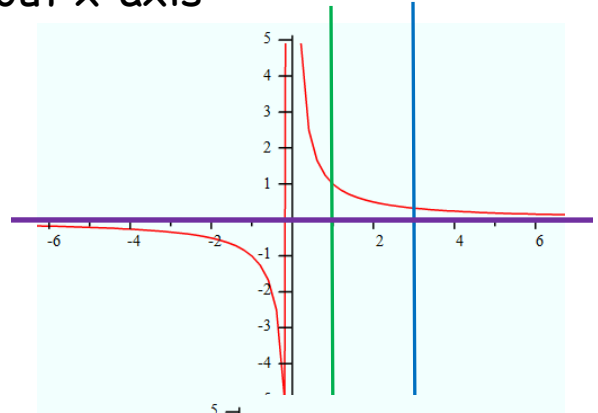
9.  $y = \cos(x)$ ,  $x = -\frac{\pi}{2}$ ,  $x = \frac{\pi}{2}$ ,  $y = 0$  about x-axis

$$\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \pi \left( (\cos x)^2 - (0)^2 \right) dx = 4.935$$



10.  $y = \frac{1}{x}$ ,  $x = 1$ ,  $x = 3$ ,  $y = 0$  about x-axis

$$\int_1^3 \pi \left( \left( \frac{1}{x} \right)^2 - (0)^2 \right) dx = 2.094$$



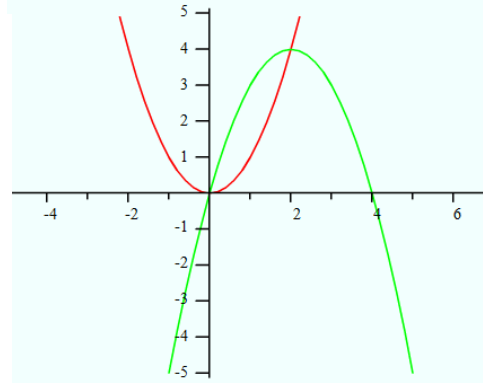
11.  $y = x^2$ ,  $y = 4x - x^2$  about :

a) x - axis

$$\int_0^2 \pi \left( (4x - x^2)^2 - (x^2)^2 \right) dx = 33.51$$

b)  $y = 6$

$$\int_0^2 \pi \left( (6 - x^2)^2 - (6 - (4x - x^2))^2 \right) dx = 67.021$$



12.  $y = 4\sqrt{x}$ ,  $y = 2x$ , about :

a) x - axis

$$\int_0^4 \pi \left( (4\sqrt{x})^2 - (2x)^2 \right) dx = 134.041$$

b) y - axis

$$\int_0^8 \pi \left( \left( \frac{1}{2}y \right)^2 - \left( \frac{y^2}{16} \right)^2 \right) dy = 53.617$$

c)  $y = -1$

$$\int_0^4 \pi \left( (4\sqrt{x} - -1)^2 - (2x - -1)^2 \right) dx = 167.552$$

d)  $x = 4$

$$\int_0^8 \pi \left( \left( 4 - \frac{y^2}{16} \right)^2 - \left( 4 - \frac{1}{2}y \right)^2 \right) dy = 80.425$$

