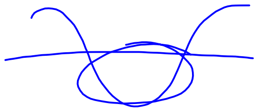
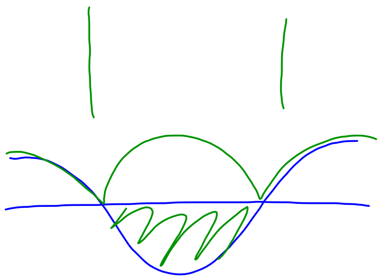
1c. $\int_0^{2\pi} |5\cos t|\,dt$



$$\int_0^{\frac{\pi}{2}} 5\cos t\,dt \left| \int_{\frac{\pi}{2}}^{\frac{3\pi}{2}} 5\cos t\,dt \right| + \int_{\frac{3\pi}{2}}^{2\pi} 5\cos t\,dt$$

$$5\sin t\Big|_0^{\frac{\pi}{2}} + \left| 5\sin t\Big|_{\frac{\pi}{2}}^{\frac{3\pi}{2}} \right| + 5\sin t\Big|_{\frac{3\pi}{2}}^{2\pi}$$



11. $a(t) = -32\ \frac{ft.}{sec^2}$

$$v(3) = 90 + \int_0^3 -32\,dt$$

$$v(t) = 90 + \int_0^t -32\,dx$$

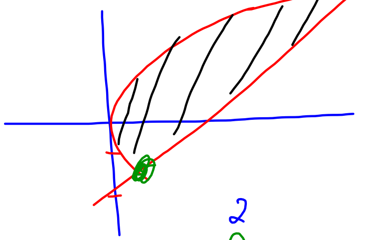
$$v(t) = 90 - 32t = 0$$

$$s(t) = \underline{\quad 0 \quad} + \int_0^t 90 - 32x\,dx$$

$$s(t) = 0 + 90t - 16t^2 = 0$$

7.2 22.

$x=y^2$ & $x=y+2$



$y^2=y+2$

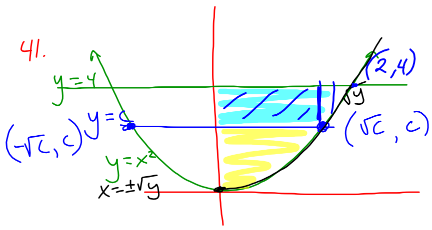
$y^2-y-2=0$

$(y-2)(y+1)=0$

$y=-1,\ 2$

$$\int_{-1}^{2} (y+2)-(y^2)\,dy$$

41.



$c=x^2$

$x=\pm\sqrt{c}$

$$\int_0^{\sqrt{c}} \left(c-x^2\right)dx = \sqrt{c}(4-c) + \int_{\sqrt{c}}^{2} 4-x^2\,dx$$

$$\left(cx-\frac{x^3}{3}\right)_0^{\sqrt{c}}$$

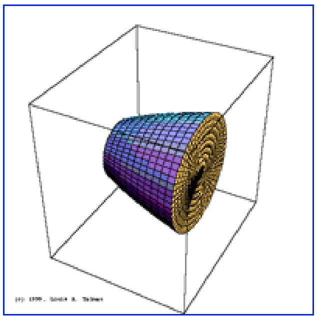
$$c\cdot c^{\frac{1}{2}} - \left(c^{\frac{1}{2}}\right)^3$$

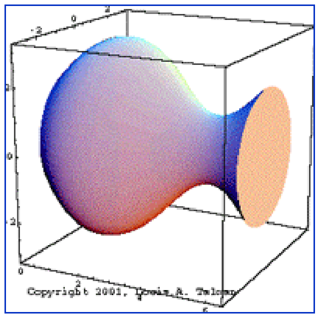
$$c^{\frac{3}{2}} - \frac{c^{\frac{3}{2}}}{3}$$

$$\frac{2}{3}c^{\frac{3}{2}} =$$

7.3 Volumes

How could we find/approximate the volume of the solid?



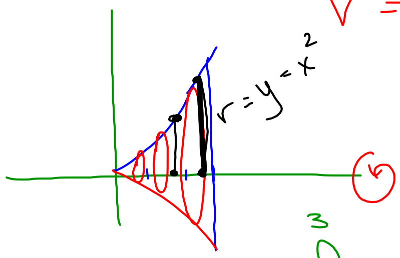


sketch a cross section
Find the area formula
Find the limits of integration
Integrate A(x) to find the volume with dx as the differential

Volumes of known cross section $$V = \int_a^b \Delta A$$

Find the volume of the solid generated by rotating $y = x^2$ about the x-axis from $x = 0$ to $x = 3$

$$V = \int_a^b \pi r^2 \, dx$$



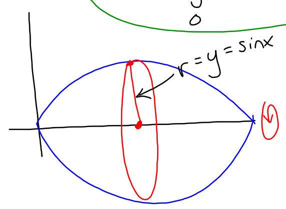
$$V = \int_0^3 \pi (x^2)^2 \, dx$$

$$V = \pi \int_0^3 x^4 \, dx$$

$$\pi \left(\frac{x^5}{5} \Big|_0^3 \right) = \frac{243\pi}{5}$$

$y = \sin x$ from $x = 0$ to $x = \pi$ about the x-axis

$$V = \pi \int_0^{\pi} (\sin x)^2 \, dx$$



$$\sin^2 3x = \frac{1 - \cos 2(3x)}{2}$$

$$\cos^2 x = \frac{1 + \cos 2x}{2}$$

$$V = \pi \int_0^{\pi} \sin^2 x \, dx$$

$$V = \pi \int_0^{\pi} \frac{1 - \cos 2x}{2} \, dx$$

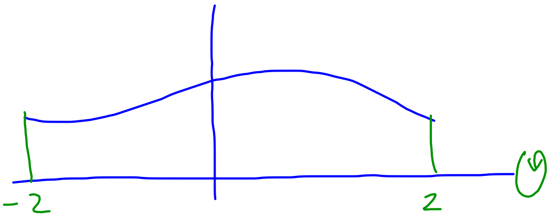
$$V = \frac{\pi}{2} \int_0^{\pi} 1 - \cos 2x \, dx$$

$$\frac{\pi}{2} \left(x - \frac{\sin 2x}{2} \right)_0^{\pi}$$

$$\frac{\pi}{2} \left((\pi - 0) - (0) \right)$$

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

The region between the graph of f(x)=xcos(x)+2 and the x-axis over the interval [-2,2] is revolved about the xaxis to generate a solid. Find the volume of the solid.



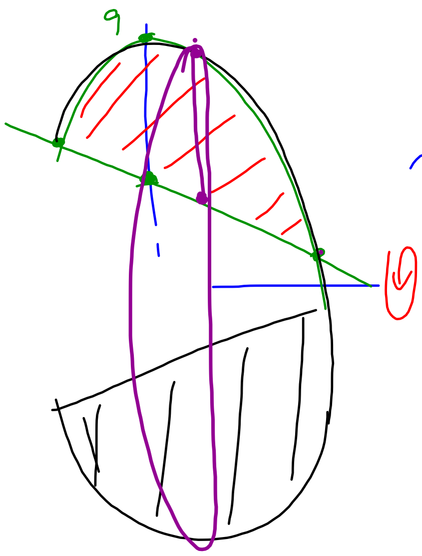
$$\pi\int_{-2}^{2} (x\cos(x)+2)^2\,dx$$

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

$$V = 52.429$$

Find the volume of the object generated by revolving
and about the x-axis.

$y = 4 - x$ $\quad y = 9 - x^2$ whole - hole



$$\pi\int (9-x^2)^2 - (4-x)^2$$

Pail

$y = \frac{3}{2}x - 3$ and x = 0 about the y-axis from y = 0 to y = 4

Rotate around the y-axis $y = x^2$ and x = 0 from y = 0
y = 2