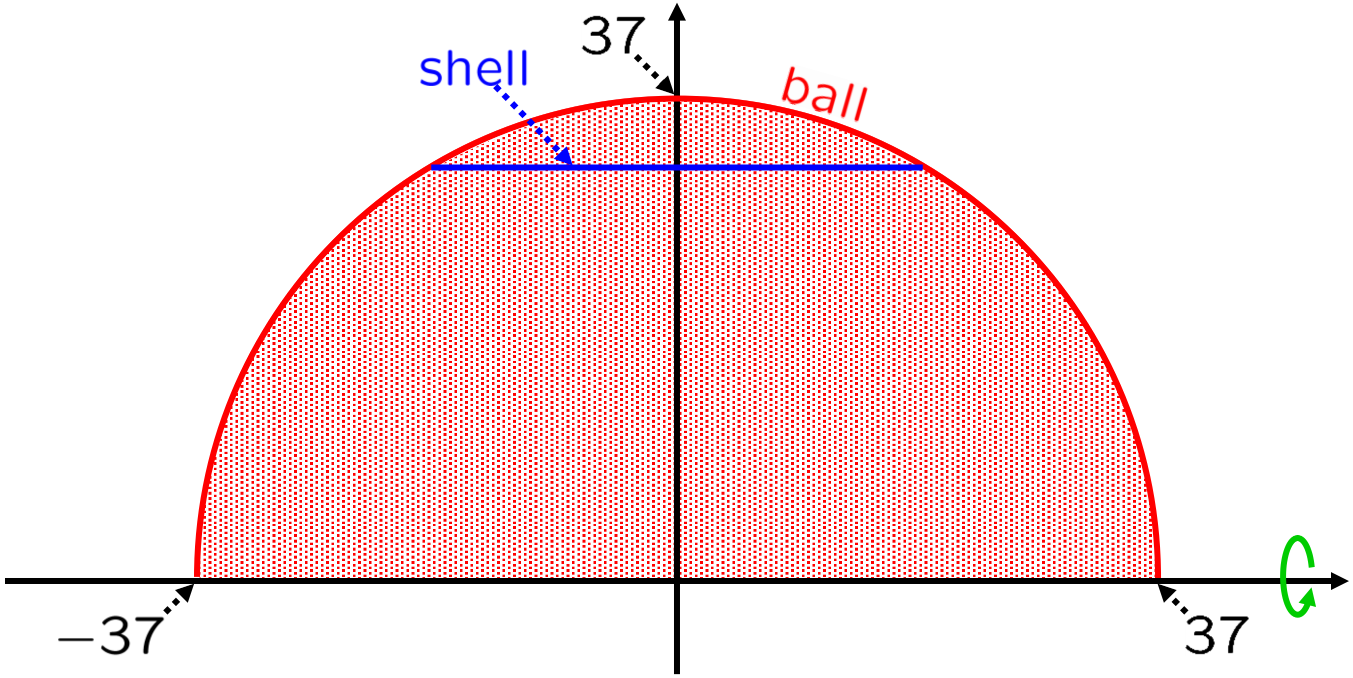
CALCULUS
Volume by cylindrical shells: Problems

OLD2

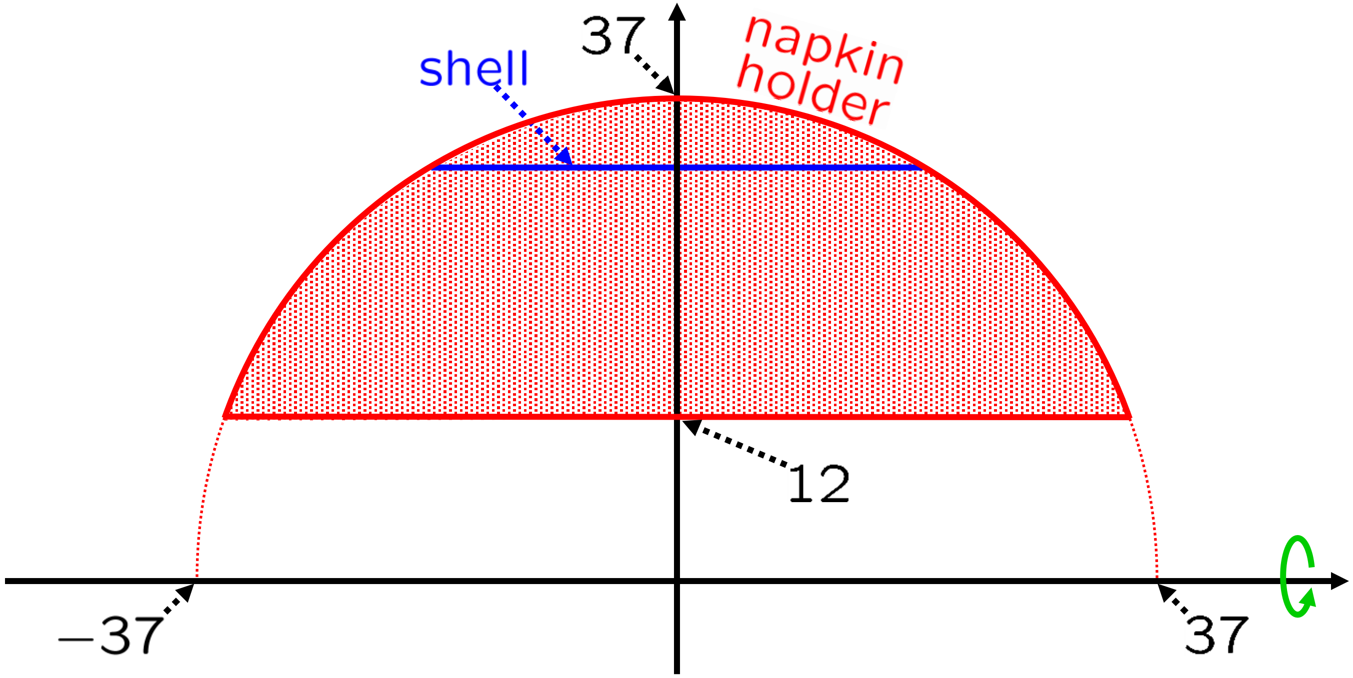
0750-1. Using the shell method, find the volume in a ball of radius 37, following the diagram shown below.

OLD2



OLD2

0750-2. We create a napkin holder by drilling a cylindrical hole of radius 12 through the middle of a ball of radius 37, as shown below. Using the shell method, find its volume.



0750-3. Let R be the region bounded by
OLD2

$$y = (x-1)^2\left(x-\frac{3}{2}\right)^2 \text{ and } y = \frac{1}{4}.$$

a. Sketch R.

b. Using whatever method you prefer, set up an integral to compute the volume of the solid obtained by rotating R about the x-axis. Do not evalute the integral.

c. Using whatever method you prefer, set up an integral to compute the volume of the solid obtained by rotating R about the y-axis. Do not evalute the integral.

d. Using whatever method you prefer, set up an integral to compute the volume of the solid obtained by rotating R about the line $x = \frac{1}{3}$. Do not evalute the integral.

0750-4. Let R be the region bounded by
OLD2

$$x = 1 + e^{-y^2},\ x = 0,\ y = 0 \text{ and } y = 2.$$

a. Sketch R.

b. Using whatever method you prefer, find the volume of the solid obtained by rotating R about the x-axis.

0750-5. Let R be the region bounded by
OLD2

$$x = y^2 + y,\ x = 0 \text{ and } y = 2.$$

a. Sketch R.

b. Using whatever method you prefer, find the volume of the solid obtained by rotating R about the line $x = -1$.

0750-6. Let R be the region bounded by
OLD2
$x = \sin y$, $x = 0$, $y = \pi/4$ and $y = 3\pi/4$.

Set up, but do not evaluate, an integral that yields the volume of the solid obtained by rotating R about the line $y = 3\pi/2$.

0750-7. Describe the solid of revolution
OLD2
whose volume is given by

$$2\pi \int_1^3 x \left[\left(e^{4x}\right) - (\cos(\pi x))\right] \, dx.$$

Do not evaluate this integral.

0750-8. Describe the solid of revolution
OLD2
whose volume is given by

$$2\pi \int_1^3 [x + 7] \left[\left(e^{4x}\right) - (\cos(\pi x))\right] \, dx.$$

Do not evaluate this integral.