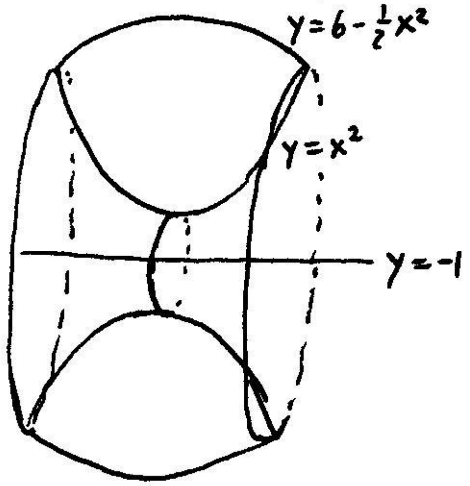
26 d :



$$Vol = \pi \int_{-2}^{2} \left[\left(7-\frac{1}{2}x^2\right)^2 - (x^2+1)^2\right] dx =$$

$$= \pi \int_{-2}^{2} \left(48 - 9x^2 - \frac{3}{4}x^4\right) dx =$$

$$= 2\pi \left[48x - 3x^3 - \frac{3}{20}x^5\right]_0^2 =$$

$$= 2\pi \left(96 - 24 - \frac{3}{20}\cdot 32\right) = \underline{\underline{2\pi\cdot\frac{336}{5}}} \approx \underline{\underline{422.23}}$$

27:

$y = b\sqrt{1-\frac{x^2}{a^2}} = \frac{b}{a}\sqrt{a^2-x^2}$ $\qquad$ $\frac{dy}{dx} = \frac{b}{a}\frac{-x}{\sqrt{a^2-x^2}}$

$$\text{perimeter} = 4\int_0^a \sqrt{1+\frac{b^2}{a^2}\frac{x^2}{a^2-x^2}}\, dx = 4\int_0^a \sqrt{\frac{a^4-(a^2-b^2)x^2}{a^2(a^2-x^2)}}\, dx$$

We can substitute $x = a\sin\varphi$, $dx = a\cos\varphi\, d\varphi$

and get $\text{perimeter} = 4\int_0^{\pi/2} a\sqrt{1-\left(1-\frac{b^2}{a^2}\right)\sin^2\varphi}\, d\varphi$

$$= 4\int_0^{\pi/2} \sqrt{a^2\cos^2\varphi + b^2\sin^2\varphi}\, d\varphi$$

but unless $b=a$, none of these integrals can be eval'd analytically in terms of the usual Calc-2-functions.