

4B. Volumes by slicing;
volumes of revolution

$$2e) \int_0^2 2\pi n(2n-u^2)^2 du = 8\frac{\pi}{3}$$

$$2g) \int_0^a 2\pi n(au)^{\frac{1}{2}} du = 4\frac{\pi}{5}a^3$$

$$5) \int_0^{\frac{a}{2}} 2\pi(\sqrt{3}u)^2 du = a^3 \frac{\pi}{4}$$

4C. Volume by Shells

$$2) \int_0^1 2\pi x^3 dx = \frac{\pi}{2}$$

$$3) \int_0^1 2\pi x(\sqrt{u}) du = \cancel{2\pi \int u^{1/2} du} \Big|_0^1 = \frac{4}{5}\pi$$

$$\int_0^1 \pi u^2 dy = \frac{\pi}{5}$$

4D. Other Applications

$$3) \int_0^R \frac{2\pi K D r dr}{1+r^2} = \pi K D l_h (1+R^2) g_{ms}$$