

Volume of Solid of Revolution

$$V = \int \pi y^2 dx$$

← This is the formula you should learn

$$V = \int \pi y^2 dx$$

$$\therefore V = \int_{-2}^2 \pi (4-x^2)^2 dx$$

$$= \pi \int_{-2}^2 16 - 8x^2 + x^4 dx$$

$$= \pi \left[16x - \frac{8}{3}x^3 + \frac{1}{5}x^5 \right]_{-2}^2$$

$$= \pi \left[\left(32 - \frac{64}{3} + \frac{32}{5} \right) - \left(-32 + \frac{64}{3} - \frac{32}{5} \right) \right]$$

$$= \frac{512\pi}{15}$$

The limits are
-2 and 2
because that's
where $y = 4 - x^2$
crosses the
x-axis

$$4 - x^2 = 0$$

$$\therefore x^2 = 4$$

$$\therefore x = 2, -2$$