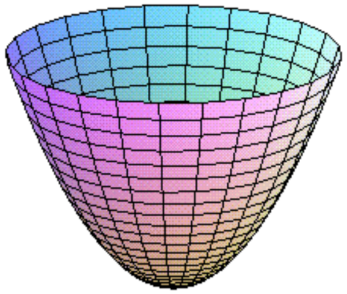
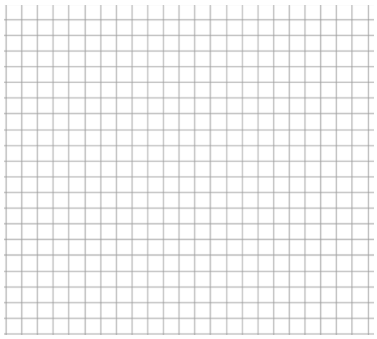
3. [5.4 Work] (10 pts) Determine the work performed by a pump used to drain the liquid contents of a tank that was formed by rotating the region bounded by $y = 2x^2$, $y = 8$ and the y-axis about the y-axis

(i) Sketch the x & y axii on this 3-D view:



(ii) Sketch the side-view. Show a slab of liquid in the drawing



(iii) Let the thickness be 'dy' Indicate this on the side view sketch above.

(iv) What will the radius and area of the slab be in terms of y?

radius: r = x, now convert 'x' to a function of 'y': r = _____

area = πr^2 = _____

(v) What will the volume and weight of the slab be?

-> volume = area * thickness, but thickness is 'dy', so just re-write the area in the blank:

volume = _____ * dy

-> weight = $\rho_o V g$ {use g = 10 and $\rho_o = 1000$}

weight = _____ * dy

(vi) How high will the slab be lifted if the exit is just above the 8 meter rim?

distance from slab height-to-exit: H = _____

(vii) What are the integral limits if we drain just over the top of the tank?

a: from y = _____ to b: y = _____

(v) Set the integral up but do not solve it

$$V = \int_{a=}^{b=} \_\_\_\_\_ \, d\_$$