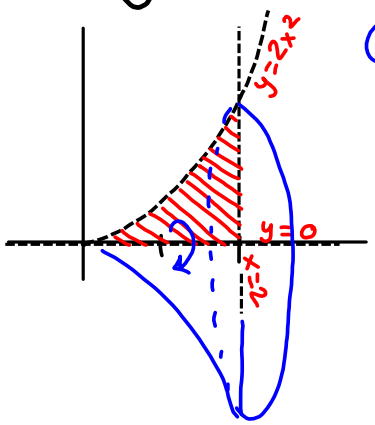
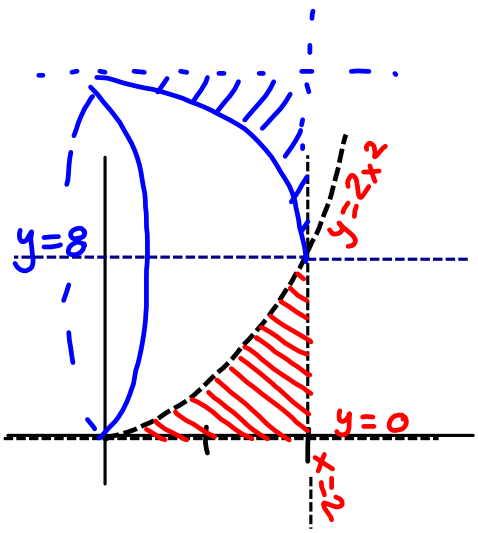
Find the volume of the solid generated by revolving the region bounded by the graphs of the equations:

12. $y = 2x^2$, $y = 0$, $x = 2$



(b) x-axis: $\int_0^2 \pi (2x^2)^2 \, dx$

Find the volume of the solid generated by revolving the region bounded by the graphs of the equations:



(c) $y = 8$

: volume of cylinder − volume of bowl

$\pi r^2 h - \int_0^2 \pi (8 - 2x^2)^2 \, dx$

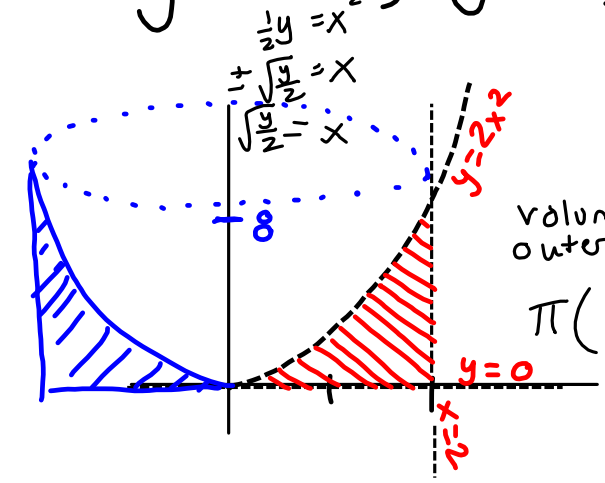
distance from center of rotation

$\pi (8)^2 \cdot 2 -$

$= 128\pi - \pi \int_0^2 (64 - 32x^2 + 4x^4) \, dx$

Find the volume of the solid generated by revolving the region bounded by the graphs of the equations:

12. $y = 2x^2$, $y = 0$, $x = 2$

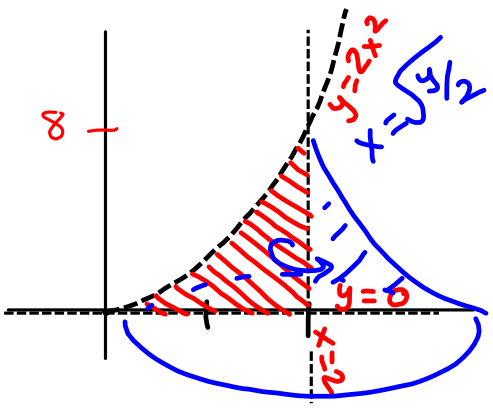


(a) y-axis

$x = \sqrt{y/2}$

volume of outer cylinder − volume of inner bowl

$$\pi(2)^2 \cdot 8 - \int_0^8 \pi\left(\sqrt{\frac{y}{2}}\right)^2 dy$$



(d) $x = 2$

$$\int_0^8 \pi\left(2 - \sqrt{\frac{y}{2}}\right)^2 dy$$

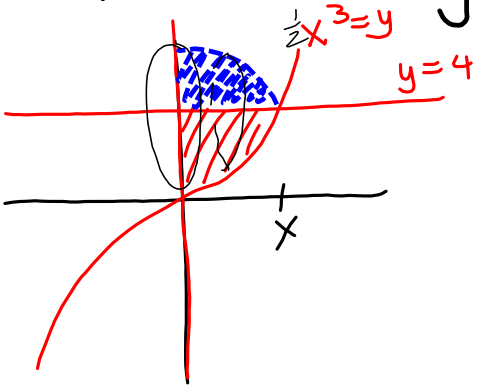
16. $y = \frac{1}{2}x^3$, $y = 4$, $x = 0$

rotate about $y = 4$

$\frac{1}{2}x^3 = 4$

$x^3 = 8$

$x = 2$



$$\int_0^2 \pi\left(4 - \frac{1}{2}x^3\right)^2 dx$$

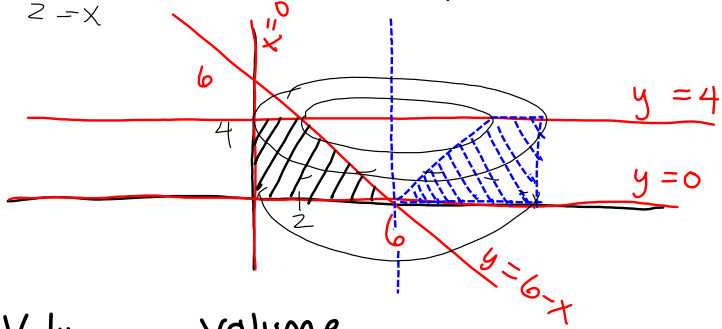
6.2 $x = 6 - y$

20. $y = 6 - x$, $y = 0$, $y = 4$, $x = 0$

$6 - x = 4$

$2 = x$

around $x = 6$



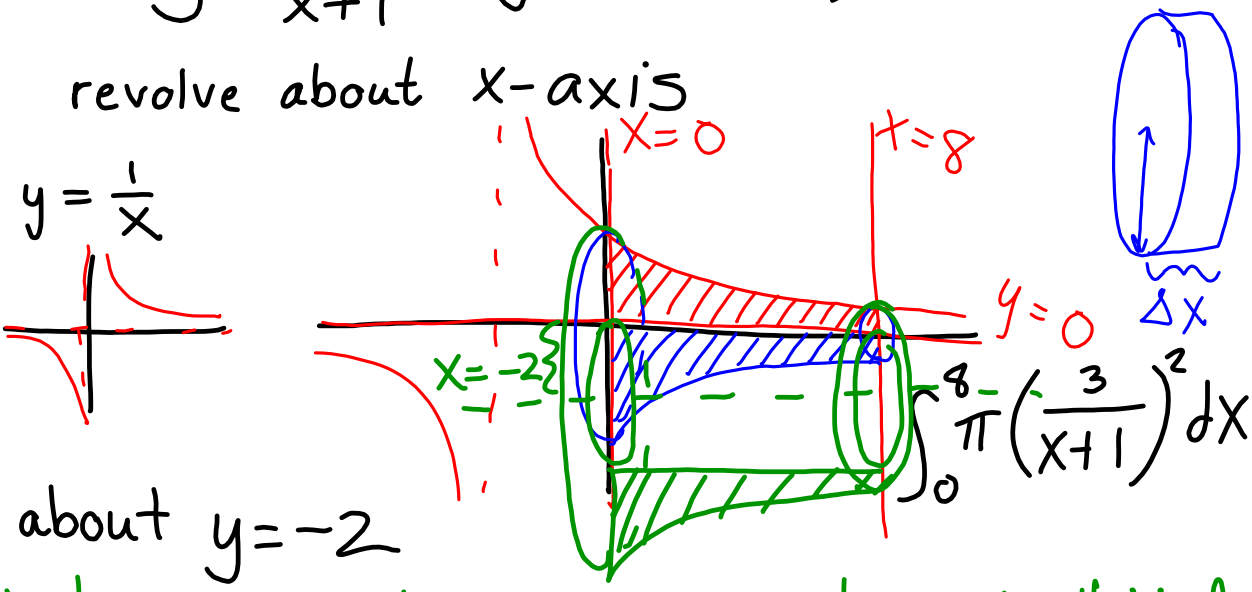
Volume = volume of outer cylinder − volume of inner cone

Geometric method $\pi(6)^2 \cdot 4 - \frac{1}{3}\pi(4)^2 4$

Calculus $\int_0^4 \pi(6)^2 dy - \int_0^4 \pi(6-(6-y))^2 dy$

26. $y = \frac{3}{x+1}$, $y = 0, x = 0, x = 8$

revolve about x-axis



$$\int_0^8 \pi \left(\frac{3}{x+1}\right)^2 dx$$

about $y = -2$

volume of volcano = volume of mountain^2 − volume of cylindrical chasm

$$= \int_0^8 \pi \left(\frac{3}{x+1} - (-2)\right) dx - \pi (2)^2 \cdot 8$$