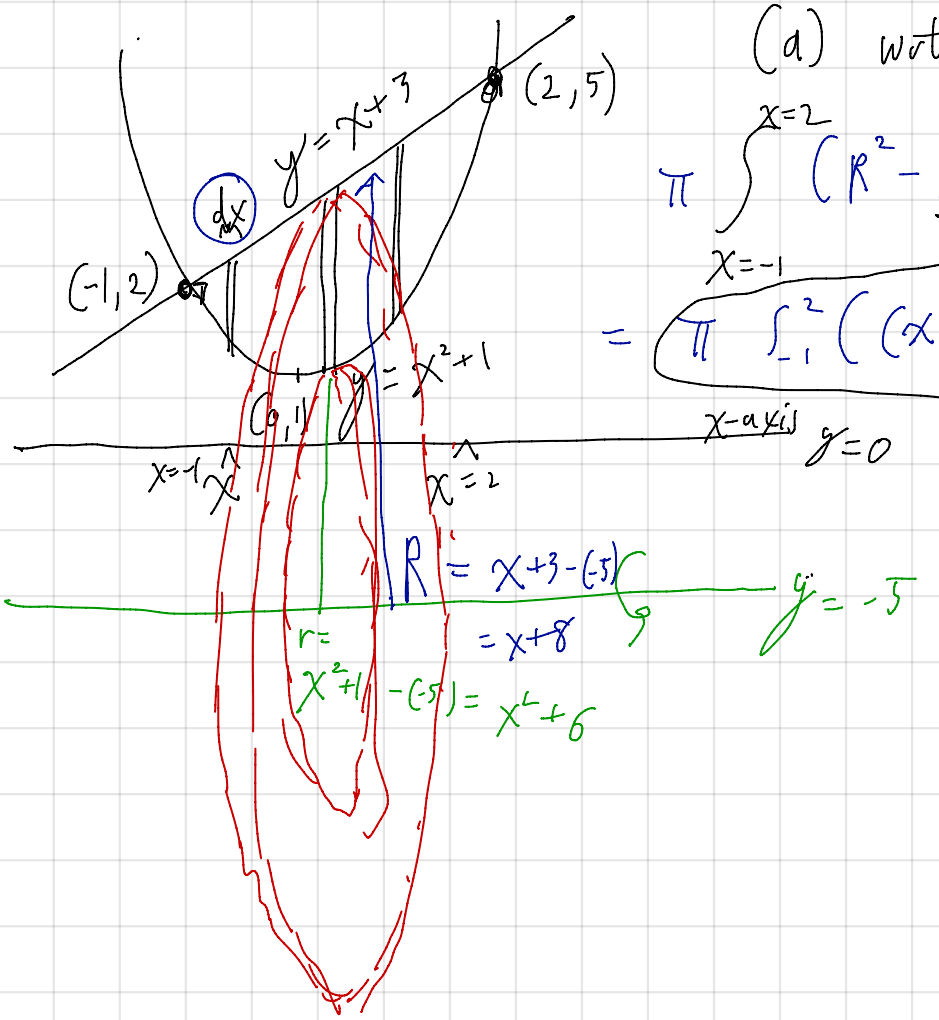
Math 1b (8:30AM) 28 Jan 2020

Problem Take the region between the curves

$$y = x^2 + 1$$
$$y = x + 3$$

and rotate it about the line $y = -5$. Write integral(s) (a) wrt x and (b) wrt y representing the volume of the resulting solid of revolution. (You do not need to evaluate/simplify the integrals.



(a) wrt x

$$\pi \int_{x=-1}^{x=2} (R^2 - r^2)\,dx$$

$$= \pi \int_{-1}^{2} \left((x+8)^2 - (x^2+6)^2 \right) dx$$

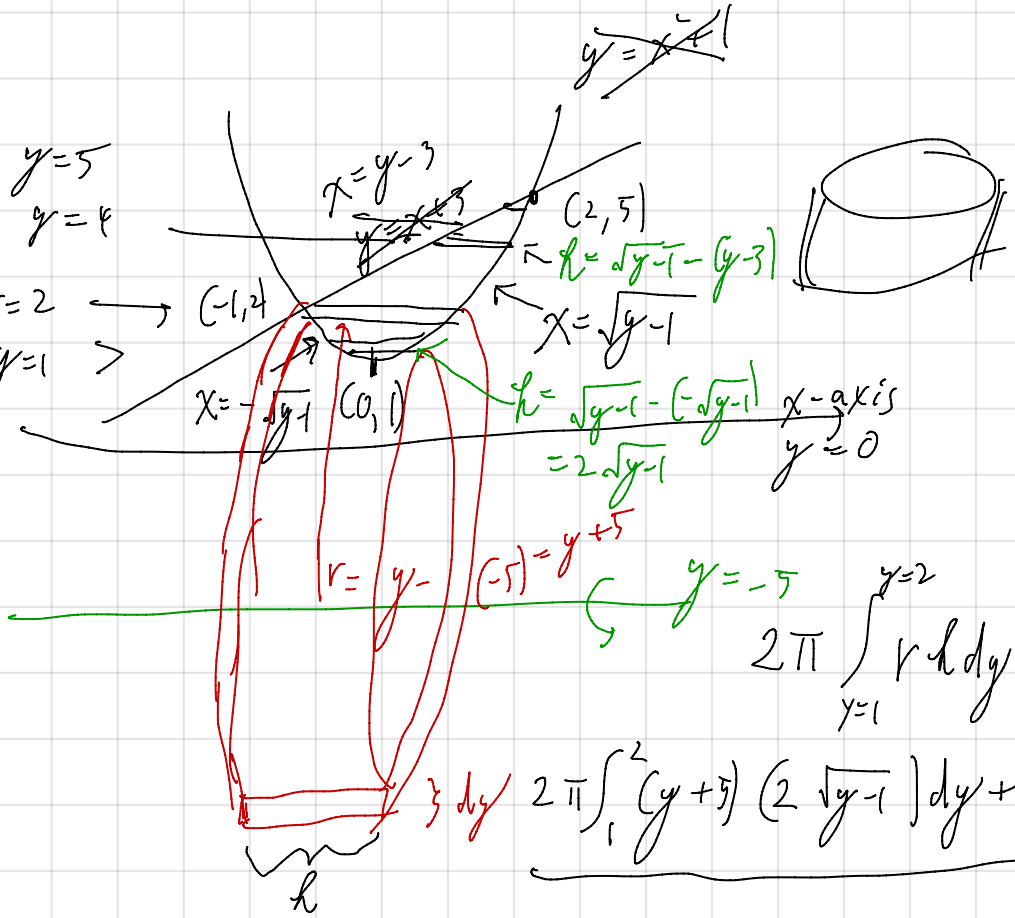
$$\pi R^2\,dx - \pi r^2\,dx$$
$$= \pi (R^2 - r^2)\,dx$$

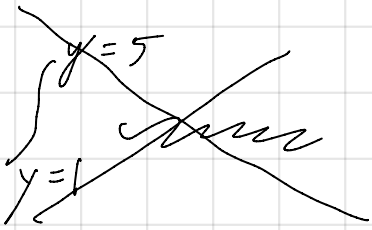
(b) wrt y

$y = x^2 + 1$

$x^2 = y - 1$

$x = \pm\sqrt{y-1}$





$$2\pi \int_{y=1}^{y=2} r\,h\,dy + 2\pi \int_{y=2}^{5} r\,h\,dy$$

$$2\pi \int_1^2 (y+5)\left(2\sqrt{y-1}\right)dy + 2\pi \int_2^5 (y+5)\left(\sqrt{y-1} - (y-3)\right)dy$$

6.4 Work (Physics)

Systems of Units

	MKS	English
Time	second (s)	second (s)
distance	meter (m)	foot (ft)
velocity	m/s	ft/s
acceleration	m/s^2	ft/s^2
Mass	Kg	slugs
Force	Newton	pounds

Mass is not the same thing as weight

The mass of an object is its resistance to being moved. A bowling ball has more mass than a feather

The weight of an object is how hard gravity pulls on it. Two objects with the same mass have the same weight if they are both in the same gravity field.

A bowling ball on the moon has the same mass as a bowling ball on earth, but less weight.