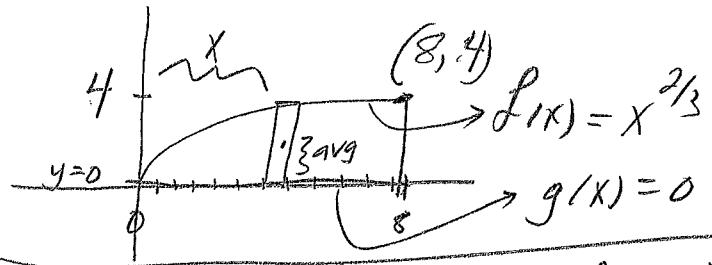


#23 $y = x^{2/3}$

density = ρ
 $y=0$
 $x=8$



$$M_x = \rho \int_0^8 (x^{2/3} - 0) \left(\frac{x^{2/3} + 0}{2} \right) dx$$

$$M_y = \rho \int_0^8 (x^{2/3} - 0) (x) dx$$

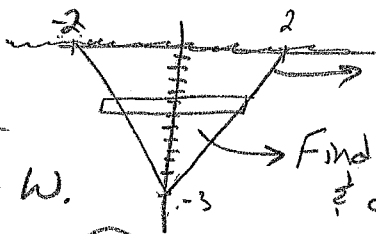
$$M = \rho \int_0^8 (x^{2/3} - 0) dx$$

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#9 did this in class

#10

assume weight density = w .



need equation: $m = \frac{3}{2} \Rightarrow y = \frac{3}{2}x - 3$
 $y\text{-int} = -3$ need function of y

$$F = 2w \int_c^d (\text{depth})(\text{length})(\text{thickness})$$

$$= 2w \int_{-3}^0 (-y) \left(\frac{2}{3}y + 2 \right) dy$$

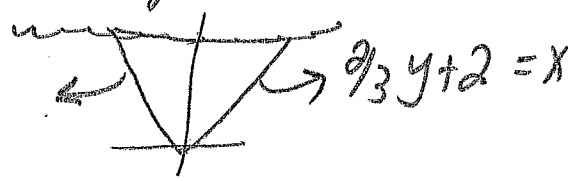
$$\Rightarrow y + 3 = \frac{2}{3}x$$

$$\Rightarrow \frac{2}{3}(y + 3) = x$$

$$= \boxed{\frac{2}{3}y + 2 = x}$$

Note: If you choose NOT To DOUBLE, use (Rt - Lft)
 you need both equations

EQn: slope = $-\frac{3}{2}$
 $y\text{-int} = -3$



Cont.
 $\Downarrow$

$$\Rightarrow y = -\frac{3}{2}x - 3$$

$$\rightarrow \text{need function of } y \Rightarrow -\frac{2}{3}y - 2 = x$$

↓ #10 cont.

$$F = w \int_c^d (\text{depth}) (\overset{\text{Length}}{Rt - Lf}) (\text{thickness})$$

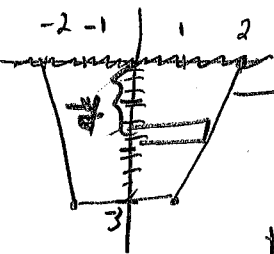
14

$$= w \int_{-3}^0 (-y) \left(\left(\frac{2}{3}y + 2 \right) - \left(-\frac{2}{3}y - 2 \right) \right) dy$$

#11

I will use symmetry and Double here, as it is much less work.

weight density = w

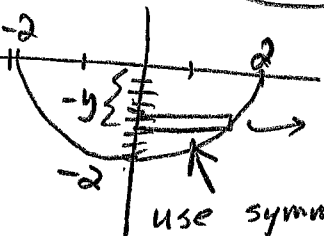


EQUATION $\Rightarrow m = \frac{3}{1} = 3 \Rightarrow y - 0 = 3(x - 2)$
 $\Rightarrow y = 3x - 6$
 $\Rightarrow y + 6 = 3x$

so $\Rightarrow \frac{1}{3}(y + 6) = x$
 $\Rightarrow \frac{1}{3}y + 2 = x$

$$F = 2w \int_{-3}^0 (-y) \left(\frac{1}{3}y + 2 \right) dy$$

#12 weight density = w



EQUATION: $x^2 + y^2 = 2^2 \Rightarrow x^2 + y^2 = 4$
 $\Rightarrow x^2 = 4 - y^2$
 $\Rightarrow x = \pm \sqrt{4 - y^2}$

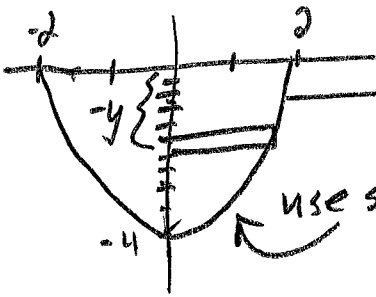
use symmetry

$$F = 2w \int_{-2}^0 (-y) (\sqrt{4 - y^2}) dy$$

in Q III so choose the positive
 $x = \sqrt{4 - y^2}$

#13

weight density = w



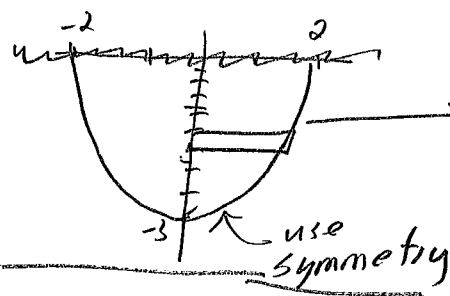
Note! $y = x^2 - 4 \Rightarrow y + 4 = x^2$
 $\Rightarrow \pm \sqrt{y + 4} = x$

In Q III choose positive

$\Rightarrow x = \sqrt{y + 4}$

so $F = 2w \int_{-4}^0 (-y) (\sqrt{y + 4}) dy$

#14 weight density = ρ



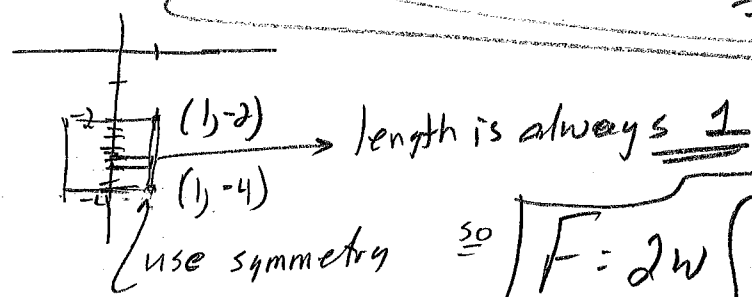
EQN: $y = \frac{1}{2} \sqrt{36 - 9x^2}$
Need function of y .

$$\begin{aligned} \Rightarrow 2y &= \sqrt{36 - 9x^2} \\ \Rightarrow 4y^2 &= 36 - 9x^2 \\ \Rightarrow -36 + 4y^2 &= -9x^2 \\ \Rightarrow \frac{1}{9}(36 - 4y^2) &= x^2 \\ \Rightarrow \pm \frac{1}{3} \sqrt{36 - 4y^2} &= x \\ \Rightarrow \frac{1}{3} \sqrt{36 - 4y^2} &= x \quad \text{choose positive in Q III} \end{aligned}$$

so

$$F = 2w \int_{-3}^0 (-y) \left(\frac{1}{3} \sqrt{36 - 4y^2} \right) dy$$

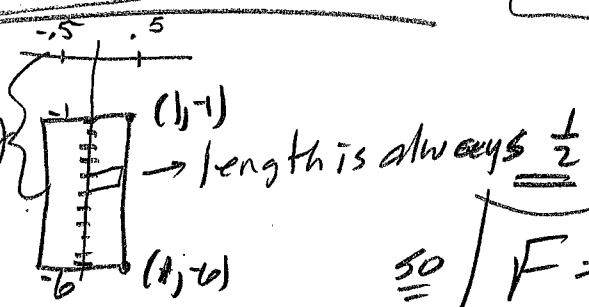
#15 assume weight density = w



so

$$F = 2w \int_{-4}^{-2} (-y)(1) dy$$

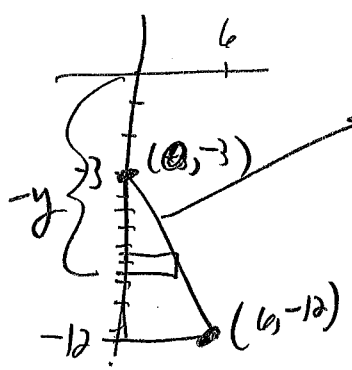
#16 weight density = w



so

$$F = 2w \int_{-6}^{-1} (-y) \left(\frac{1}{2} \right) dy$$

#17 weight density = w



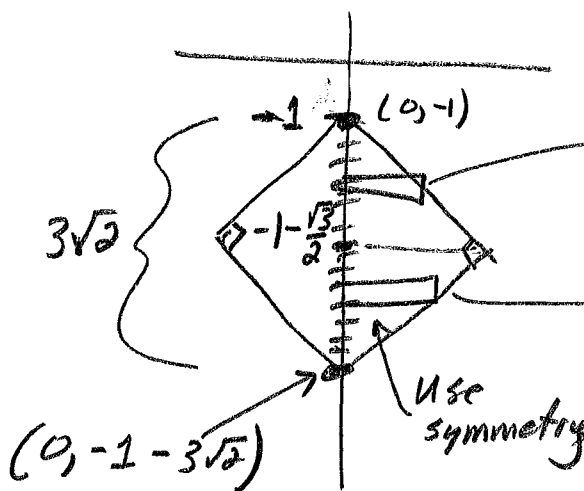
Need equation. $m = \frac{-9}{6}$
 $y\text{-int} = -3$
 $\Rightarrow y = -\frac{3}{2}x - 3$

$$\begin{aligned} \Rightarrow y + 3 &= -\frac{3}{2}x \\ \Rightarrow -\frac{2}{3}(y + 3) &= x \\ \Rightarrow -\frac{2}{3}y - 2 &= x \end{aligned}$$

so

$$F = w \int_{-12}^{-3} (-y) \left(-\frac{2}{3}y - 2 \right) dy$$

#18

weight
density
= w 

$$m = -1 \Rightarrow y = -x - 1 \Rightarrow y + 1 = -x \\ y - mt = -1 \Rightarrow -y - 1 = x$$

$$m = 1 \\ y - mt = -1 - 3\sqrt{2}$$

$$\hookrightarrow y = 1x + (-1 - 3\sqrt{2})$$

$$y = x - 1 - 3\sqrt{2}$$

$$\Rightarrow y + 1 + 3\sqrt{2} = x$$

So

$$F = 2w \left\{ \int_{-1-3\sqrt{2}}^{-1-\frac{\sqrt{3}}{2}} (-y)(y+1+3\sqrt{2}) dy + \int_{-1-\frac{\sqrt{3}}{2}}^{-1} (-y)(-y-1) dy \right\}$$