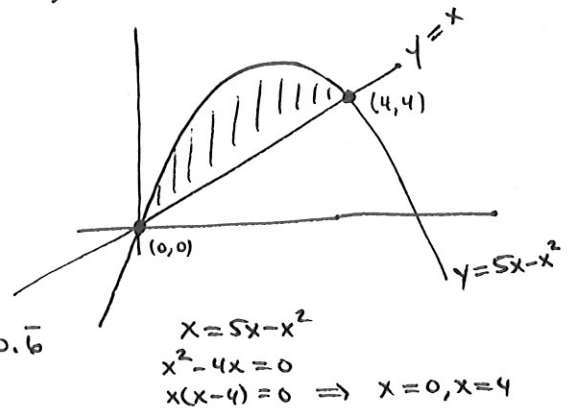


QUIZ 16

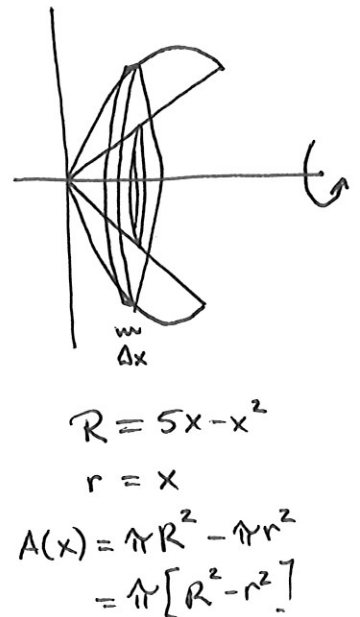
1. (4 points) Find the area of the region bounded by $y = 5x - x^2$ and $y = x$.

$$\begin{aligned} \text{Area} &= \int_a^b (\text{top}) - (\text{bottom}) \, dx \\ &= \int_0^4 (5x - x^2) - x \, dx \\ &= \int_0^4 4x - x^2 \, dx \\ &= 2x^2 - \frac{1}{3}x^3 \Big|_0^4 = 8 - \frac{64}{3} = \frac{32}{3} = 10.\bar{6} \end{aligned}$$

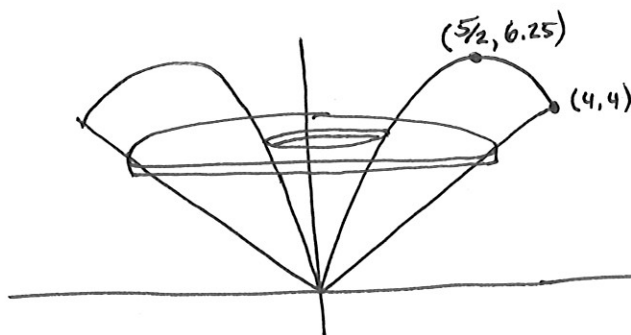


2. (6 points) Find the volume of the region described in #1 when it is rotated about the x -axis.

$$\begin{aligned} V &= \int_a^b A(x) \, dx \\ &= \int_0^4 \pi [(5x - x^2)^2 - x^2] \, dx \\ &= \pi \int_0^4 25x^2 - 10x^3 + x^4 - x^2 \, dx \\ &= \pi \left[8x^3 - \frac{5}{2}x^4 + \frac{1}{5}x^5 \right]_0^4 \\ &= \frac{384\pi}{5} \\ &\approx 241.2743158 \end{aligned}$$



3. (extra credit) Find the volume of the region described in #1 when it is rotated about the y -axis.



← can't use slices here
 b/c R & r would
 come from the same
 function