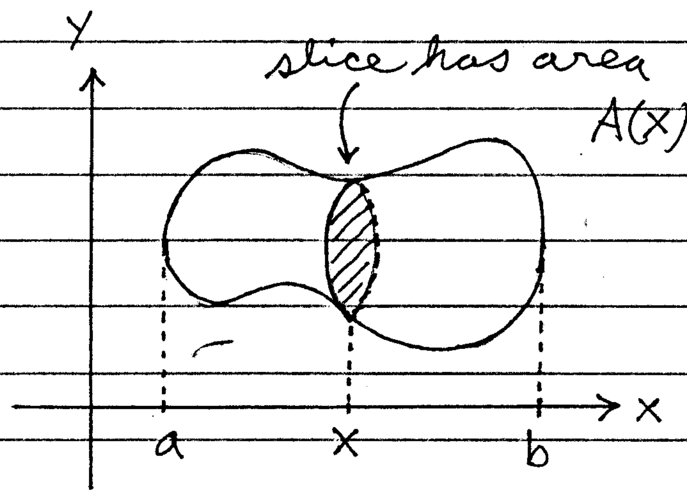
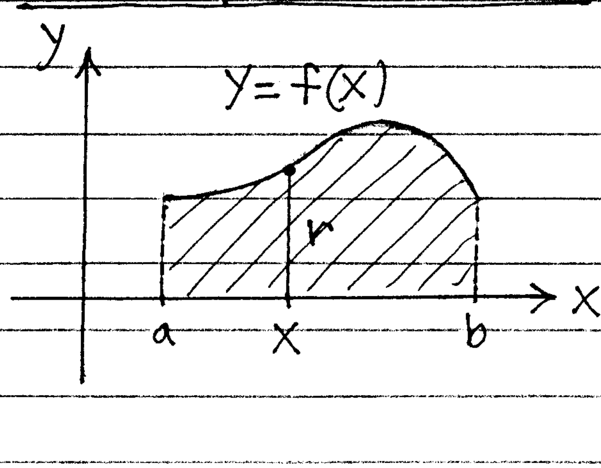
Math 17B
Koruba
Volume

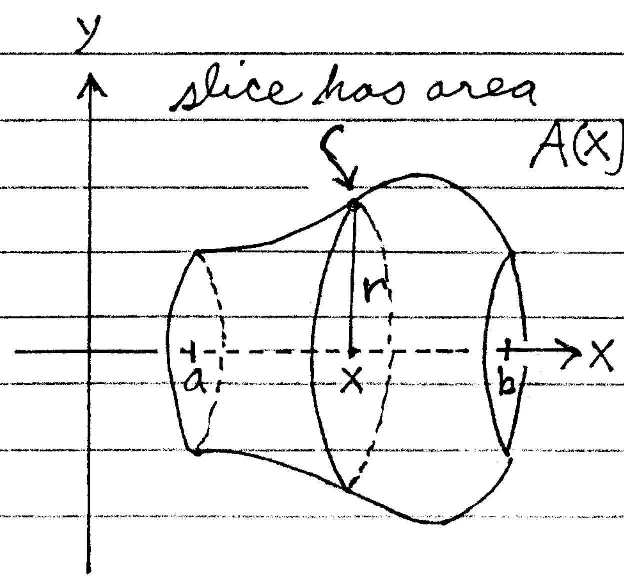
Assume that a solid object is suspended above the x-axis from $x=a$ to $x=b$. Assume that the area $A(x)$ of a cross-sectional slice taken perpendicular to the x-axis at x is known. Then

$$\boxed{\text{Volume} = \int_a^b A(x)\,dx}$$



Solid of Revolution





Consider a region R below the graph of $y=f(x)$ and above the interval $[a,b]$. Create a <u>solid of revolution</u> by revolving R about the x-axis. The cross-sectional slice at x is a circle with area

$$A(x) = \pi r^2 = \pi (f(x))^2 .$$

so $$\boxed{Vol = \int_a^b \pi (f(x))^2 \, dx}$$

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