11.4 Perpendicular Cross Sections

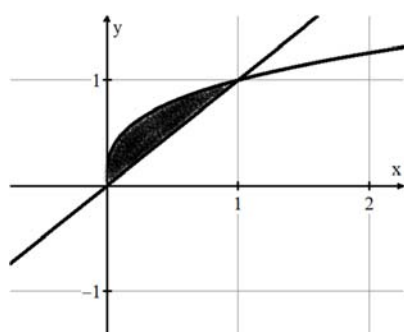
Calculus Name: ______________________________ **CA #1**

The base of an object is bounded by the lines $y = x^2 - x - 3$ and $y = x$. Find the volume of the object with the indicated cross sections taken perpendicular to the x-axis. Use a calculator after you set up the integral!

1. Squares	2. Equilateral triangles
3. Semi-circles	4. Isosceles right triangles (side is the base)

5. Set up the integral to find the area of the region bounded by $y = \sqrt[3]{x}$, and $y = x$. DO NOT EVALUATE.

With respect to x.



With respect to y.

6. The region bounded between $y = \frac{1}{x}$ and the x-axis between the vertical lines $x = 1$ and $x = e$ is rotated about the line $y = -2$. What is the integral that represents the volume of the resulting solid of revolution?

Answers to 11.4 CA #1

1. $\int_{-1}^{3}(-x^2+2x+3)^2\,dx = 34.133$	2. $\frac{\sqrt{3}}{4}\int_{-1}^{3}(-x^2+2x+3)^2\,dx = 14.78$	3. $\frac{\pi}{8}\int_{-1}^{3}(-x^2+2x+3)^2\,dx = 13.404$
4. $\frac{1}{2}\int_{-1}^{3}(-x^2+2x+3)^2\,dx = 17.067$	5a. $\int_{0}^{1}\left(\sqrt[3]{x}-x\right)dx$	
5b. $\int_{0}^{1}(y-y^3)\,dy$	6. $\pi\int_{1}^{e}\left(\frac{1}{x}+2\right)^2-4\,dx$	