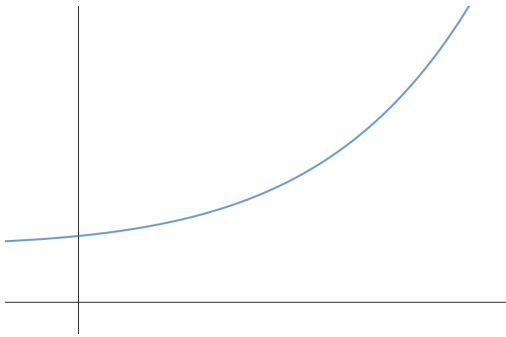Name: _____ PID: _____

- Print your *NAME* on every page and write your *PID* in the space provided above.

- Show all of your work in the spaces provided. No credit will be given for unsupported answers, even if correct.

- No calculators, tablets, phones, or other electronic devices are allowed during this exam. You may use one page of handwritten notes, but no books or other assistance.

(1 pt) 0. Follow the instructions on this exam and any additional instructions given during the exam.

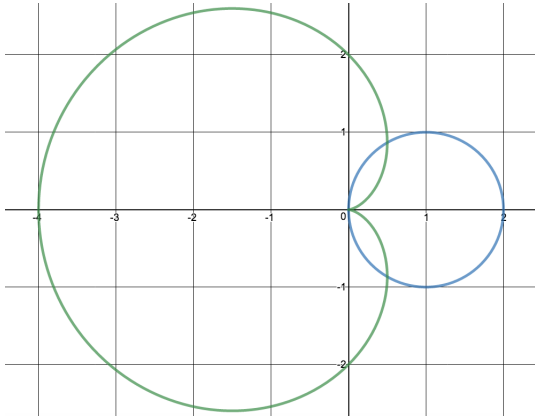(6 pt) 1. Compute the integral: $\displaystyle \int \frac{u^2}{\sqrt{3u+1}}\, du$

(6 pt) 2. Consider the region bounded by the curves $y = 3 + xe^x$, $y = 3$, and $x = 2$. Find the volume of the solid obtained by rotating this region about the axis $y = 3$.

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(6 pt)   3. What is the area inside the circle $r = 2\cos(\theta)$ but outside the cardioid $r = 2 - 2\cos(\theta)$.

(6 pt)   4. Find the area of the region bounded by the curves $y = 2x$ and $y^2 = 2x + 2$.