

You are encouraged to work in groups of two to four on this assignment and make a single group submission. Each problem is worth 3 points for correct and clearly justified answers. An additional quality point will be awarded to submissions which are presented in a manner appropriate to good college-level work.

1. Derive the integration formula $\int \frac{x}{\sqrt{ax+b}} dx = \frac{2}{3a^2}(ax-2b)\sqrt{ax+b} + C$ [Line 83 on the table in the back of the book].
2. Consider the parabola $y = x^2$. Pick a point (a, a^2) on this parabola, and label it P . Label the point $(-a, a^2)$ as Q . Find the lines tangent to the parabola at P and Q , and label their point of intersection R . Find the area of the region below segment PQ and above the parabola, and show that this area is equal to two-thirds of the area of triangle PQR .
3. Set up an integral for #55 in §6.3 and use it to find the volume of the torus.

