(20 points.) This is a closed book quiz. You must show work in order to receive credit. Any student caught cheating will receive a score of zero.

1. (7 points) Compute the arclength of \( f(x) = \frac{1}{3}(x^2 + 2)^{3/2} \) for \( 0 \leq x \leq 3 \).

2. (6 points) Compute the minimum work done in pumping a fluid of density \( \rho \) kg/m\(^3\) from a (square) box-shaped container with base length \( L \) m.
3. (7 points) Compute the volume of the solid obtained by revolving the region enclosed by the curves $y = x^3, y = 1,$ and $x = 0$ about the $y$-axis.