**Problem** 1. Find the length of the curve $y = \frac{2}{3}x^{3/2}$ from $x = 0$ to $x = 1$.

**Problem** 2. For what value of $A$ is $f(x)$ a probability density function?

$$f(x) = \begin{cases} A\sin^2(x), & 0 \le x \le \pi \\ 0 & \text{otherwise} \end{cases}$$