PHY 337– Problem Set # 1

Read Chapter 6 of **Marion**.

1. Consider the integral

$$\mathcal{I} \equiv \int_0^1 \sqrt{1 + \left(\frac{dy}{dx}\right)^2}\, dx. \tag{1}$$

Evaluate $\mathcal{I}$ (using Maple if you prefer) for:

(a) $y(x) = x$

(b) $y(x) = x^2$

(c) $y(x) = x^3$

Which function $y(x)$ yields the smallest value of $\mathcal{I}$ and why?