

$$\begin{aligned}y &= \int_1^x \sqrt{t^3 - 1} dt \Rightarrow dy/dx = \sqrt{x^3 - 1} \quad [\text{by FTC1}] \\ \Rightarrow 1 + (dy/dx)^2 &= 1 + (\sqrt{x^3 - 1})^2 = x^3 \\ \Rightarrow L &= \int_{16}^{25} \sqrt{x^3} dx = \int_{16}^{25} x^{3/2} dx = \frac{2}{5} [x^{5/2}]_{16}^{25} = \frac{2}{5}(3125 - 1024) = \frac{4202}{5} = \\ &840.4\end{aligned}$$