1. Find the length of the curve with equation \( y = \frac{x^2}{2} - \frac{\ln(x)}{4}, 2 \leq x \leq 4. \)

   \textit{Answer: } 6 + \frac{1}{4} \ln(2).

2. Find the length of the curve with equation \( y = \ln\left(\frac{e^x + 1}{e^x - 1}\right), 0 < a \leq x \leq b. \)

   \textit{Answer: } \ln\left(\frac{\sinh(b)}{\sinh(a)}\right)

   \textit{Hint: } You should get \( ds = \frac{e^{2x} + 1}{e^{2x} - 1} \) \( dx. \) Divide the numerator and denominator by \( e^x \) to see an easy integral.

3. Find the area of the surface generated when the curve \( 9x = y^2 + 18, 2 \leq x \leq 6 \) is rotated about the \( x \)-axis.

   \textit{Answer: } 49\pi.

   \textit{Hint: } It is easier if you write \( ds \) in terms of \( dy. \)

4. Find the area of the surface generated when the curve \( x = a \cosh\left(\frac{y}{a}\right), -a \leq y \leq a, \) is rotated about the \( y \)-axis.

   \textit{Answer: } \pi a^2 (\sinh(2) + 2)

   \textit{Hint: } Remember that \( 1 + \sinh^2(z) = \cosh^2(z), \) and use the definitions of \( \cosh \) and \( \sinh. \)