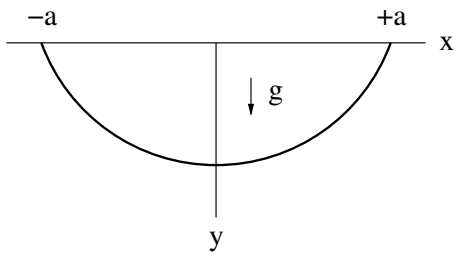
[mex38] Catenary problem II

Consider a chain of length L and mass per unit length ρ_L. Its ends are suspended from two fixed points which are positioned at the same height and a distance $2a$ apart. The chain is bent into a characteristic profile $y(x)$ by a uniform graviational field g.
(a) Use the calculus of variation with an auxiliary integral constraint to show that the shape of the chain is described by the function, $y(x) = B\cosh(x/B) - A$, where A, B are constants.
(b) Determine the constants A, B for a chain with the following specifications: $a = 20$m, $L = 50$m.
(c) What is the vertical distance from the ceiling of the lowest link in the chain.



Solution: