Mechanics – Problem I (8 points)

Jumping particle

A particle moves along the positive axis Ox (one-dimensional situation) under a force that's projection on Ox is $F_x = F_0$ as represented in the figure below (as function of x). At the origin of Ox axis is placed a perfectly reflecting wall.
A friction force of constant modulus $F_f = 1{,}00\,N$ acts anywhere the particle is situated. The particle starts from the point $x = x_0 = 1{,}00\,m$ having the kinetic energy $E_c = 10{,}0\,J$.

a. Find the length of the path of the particle before it comes to a final stop

b. Sketch the potential energy $U(x)$ of the particle in the force field F_x.

c. Draw qualitatively the dependence of the particle speed as function of his coordinate x.

