7-8)

Consider a uniform rope of length L and mass M. One fourth of the rope hangs over the edge of a frictionless table. A force is applied to the end on the table to hold the rope in place. Now, the force slowly pulls the rope so that its hanging end rises onto the tabletop.

a) Find the force necessary to do this as the rope rises to the table. Then find the work done by the force.
b) Instead, consider the mass of the hanging portion to be concentrated at its center of mass, and calculate the work necessary to raise the quarter rope to the tabletop.
c) Compare the results.