Two Difficult Friction Problems

A 100 kg object is on grass. You are pulling it with a horizontal force of 833 N, and the object is sliding at 1.5 m/s. Suppose, through divine intervention perhaps, that the constant of acceleration near the Earth changed suddenly to half its current value (i.e. to 4.9 m/s/s). What force would you need to be applying to keep the object moving at 1.5 m/s? What force would be required to keep the object moving at a new constant speed of 4.5 m/s?

Object A (weight = 50 N) slides on top of the much larger object B (weight 10,000 N). The coefficient of sliding friction between the two objects is 0.25. The objects are transported to a distant planet which has a diameter of 8000 km and a mass of $8 \times 10^{25}$ kg. How much force would it take to slide A along B at constant velocity on this new planet? How much force would it take on the new planet to accelerate object A along B from 1 m/s/s to 10 m/s/s in a 5 second interval?