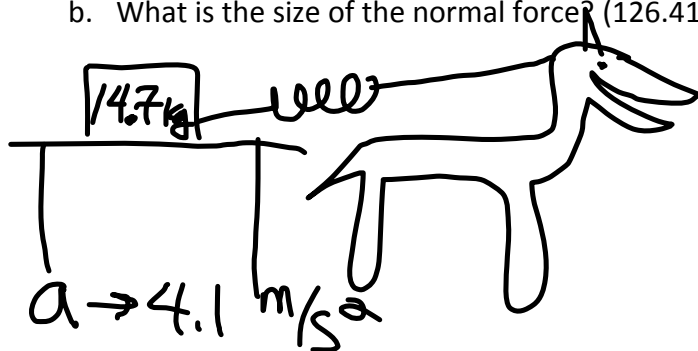


Dynamics with Springs

Physics

1. A box is being pulled along a horizontal table by a rope connected to a donkey's shoulders at an angle of 15° to the table. There is a spring between the rope and the box with $k = 12.2 \text{ N/cm}$. The mass of the box is 14.7 kg . If friction is opposing the box's motion with a constant force of 5.6 N , and the box is accelerating at 4.1 m/s^2 horizontally:
 - a. How many centimeters does the spring stretch? (5.59 cm)
 - b. What is the size of the normal force? (126.41 N)



2. A football with a mass of 0.32 kg is hooked to an airplane by a spring at a constant angle (with the vertical) of 24° . The spring is stretched out 11 cm . The football is not moving in the vertical direction.
 - a. What is the spring constant of the spring (in N/cm)? (0.31 N/cm)
 - b. How quickly is the football accelerating horizontally? (4.36 m/s^2)



3. A baseball is thrown directly up into the air. It is attached to a spring that is hooked to the ground. The spring has a k of 0.41 N/cm . When the spring has stretched out 5.6 cm , the baseball has an instantaneous acceleration of 11.4 m/s^2 downward. What is the mass of the baseball? (1.44 kg)

