Planet Holloway **websheet Fall Review 2 (Forces)**
AP Physics C - Chapter 4
You may print this out and write on it or work on your own paper.
Show all work.

1. A marble slides frictionlessly inside a horizontal hoop on a table in uniform circular motion. If the normal force from the hoop is 4 N, what happens to the normal force if the radius is tripled and the frequency is doubled?

2. A spring launcher fires two projectiles with unknown masses, M_1 and m_2. The launcher exerts the same force on each projectile, but the force is unknown. The acceleration of each projectile is measured to by a_1 and a_2. What is the ratio of M_1 to m_2?

3. A hair dryer ejects 1×10^{-4} kg of air per second at a speed of 2.6 m/s. What is the force a person must exert horizontally to keep the hair dryer from accelerating?

4. A block of ice (4 kg) slides without friction down a 40° incline. What is the acceleration of the block? What is the normal force on the block?

5. An elevator contains a 65 kg ostrich. What is the apparent weight of the ostrich as the elevator accelerates up at 2 m/s/s? What is the apparent weight of the ostrich when the elevator travels down at a constant 3 m/s?

6. A snowboarder slides down a 37° slope at a constant 4 m/s. What is the coefficient of kinetic friction?

7. A box of orange marmalade (14 kg) is slid up a 20° slope with the coefficient of kinetic friction being 0.15 and the coefficient of static friction being 0.25. What is the acceleration of the marmalade up the ramp? What is the acceleration down the ramp?

8. A 12 kg bag of hydro spanners starts with a velocity of 6 m/s and moves in a straight line as described by $v = 6 + 3t + 2t^3$. What is the net force on the bag at 4 seconds? How much work is done on the bag in the first 3 seconds?

9. If a 4 m cord attached to bridge can hold 25 kg maximum before breaking, with what speed can a 5 kg object be twirled by a 1.5 m section of that cord in a horizontal circle without breaking the cord?

10. If the force acting on a particle of mass *m* starting at rest is given by F = bt + c, what is the velocity function of the particle?

Answers:

1. 48 N

2. a_2/a_1

3. 2.6×10^{-4} N

4. 6.43 m/s/s, 30.64 N

5. 780 N, 650 N

6. 0.75

7. -4.8 m/s/s up the ramp and $+2.0$ m/s/s down the ramp

8. 1188 N (a = 99 m/s/s), 378 J (using ΔK)

9. 8.66 m/s

10. $\dfrac{\dfrac{b}{2}t^2 + ct}{m} = \dfrac{bt^2}{2m} + \dfrac{ct}{m} = \dfrac{bt^2 + 2ct}{m}$ (all three are equivalent)