Homework Discussion, Week 5

Physics 1301   Dr. Andersen

Chapter 6

51.) In this case, the normal force acts upward, the weight of the car downward, and the acceleration is a centripetal acceleration (which points downward), so $\mathbf{F} = m\mathbf{a}$ can be written as

$$N - mg = -m\frac{v^2}{r}$$

In order to feel weightless, $N = 0$, so $v = \sqrt{rg}$.

71.) Again use $\mathbf{F} = m\mathbf{a}$. In this case, the x-component equation will be

$$T\sin\theta = ma = m\frac{v^2}{r}$$

and the y-component equation will be (notice, no acceleration in the vertical direction)

$$T\cos\theta - mg = 0.$$

Now just solve the two equations for the two unknowns.

Chapter 7

10.) a) From the definition of the work, $W = Fd\cos\theta = (50.0\ N)(0.50\ m)\cos 55° = 14\ J$. b) Increasing the angle with the floor causes the cosine to get smaller, so the work would decrease.