

Physics 261: Problem Set #6

These problems are due at the end of the day on Friday, November 4.

1. I'll ask you to print out a cell or two from the Thursday session
2. BTM 3.1.3, 3.1.4, 1.6.7 and 3.1.6
3. Morin 3.40
4. Morin 3.61
5. Morin 5.8
6. Morin 5.41
7. Morin 5.45
8. Morin 5.68
9. A boxcar rides on frictionless tracks while subject to a constant external force of size F . At time $t = 0$ it starts from rest at position $x = 0$, and with empty weight M_0 . Throughout this process, sand flows at a rate b kg/sec from a stationary hopper into the moving boxcar (thus its mass at time t is $M(t) = M_0 + bt$.) Find the velocity $v(t)$ and position $x(t)$ of the boxcar. (Note: the intent here is for you to derive and solve the differential equation for the motion, but it is also possible to use the idea of impulse to find the velocity with almost no calculation.)
10. (BONUS) Morin 5.47 (see 5.5 first)