“Homework” and homework.

You really learn and absorb (take possession of) only what you work through yourself, certainly in this class. Our graded homework is not even the minimum – it is more of a guide, pointers for work, or a distillation. You really need to solve many more problems. Also, please note that we are entering the last phase of this class: there will be no time to catch up, to finish things off, etc. Now we need to do it in real time: get the material\(^1\) as we cover it. (You always want this.)

Starred problems below are suggestions for practice. Also use: the “Practice Homework” posted on the Materials page of our Web site, and “Suggested problems” on the Classes page.

Homework # 7

1. From Chapter 6, problem 57. Typical. Make sure you justify the answer you choose.

   \* Chapter 6, problem 56 is a good exercise, while \# 58 is excellent to think through.

   A different, but most excellent problem is: Chapter 6, problem 72.

2. Chapter 7, problem 31. A very useful problem. Partly, has a similar point to \# 40.


5. Chapter 7, problem 40. [Answers. (a): 19.6 N. (b): 0.481 m/s\(^2\) downward. (c): 21 N.]

   A useful problem. Friction is removed to simplify the main point. Make sure to understand why tension is different, this is the point.

6. Remember the 2nd problem from the midterm? Let’s phrase it as intended: what is the most effective way to transport a box across the floor? Assume a given fixed force, that can be used to either push or pull. The coefficient of friction is presumed known (say, \(\mu_k\)).

   \textit{Hint}. It’s better to pull, of course: explain. Then, once you pull – what is the best angle?

7. How about the 3rd problem from the midterm, part (B)? Here’s the real question: what is the angle to set, so to stop the system from accelerating? (With both boxes there, connected.) To not worry about the initial conditions, take masses to be: \(m_1=10\ \text{kg}\) and \(m_2=2\ \text{kg}\), if you insist on numbers. The idea is to get a symbolic expression, \(\theta_{a=0}(m_1, m_2, \mu_k)\), though. Are there any conditions/restrictions on the parameters \((m_1, m_2, \mu_k)\) in your result?

   \textit{Hint}. You may end up using something like \(\cos \theta = \sqrt{1 - \sin^2 \theta}\) (or, sine expressed via cosine).

Momentum & Co. \hspace{1cm} \textbf{Reading: Chapter 9.}

8. From Chapter 6, problem \# 60. \hspace{1cm} \textit{Hint}. \(\Delta p = \int F \, dt\); or, directly from \(F_x = ma_x = m \frac{dv_x}{dt}\).

9. Chapter 9 problem \# 28. [Answers. (a): 6.4 m/s. (b): 3.6 \cdot 10^2 \text{ N.}]

Short homework (“Mastering Physics” assignment)

Chapter 9, problems: 8, 16, 24.

\(^1\)“Get the material” like in: make it \textit{yours}. 