

# ~ Repetition & Variation ~

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This packet is the beginning of MIDTERM PREPARATION. All of the problems on the midterm exam will be VARIATIONS of homework problems. But they won't be trivial variations. In other words, you'll have to THINK on the exam, but you'll be thinking about something FAMILIAR. So, preparing for the exam is all about

- (1) Mastering homework problems; and
- (2) Practicing variations of homework problems.

That's what this packet is all about.

1. If there are any recent homeworks that you did not manage to complete, try those again and see what you can get through.
  
2. AFTER you have tried all the problems in all recent homeworks, review the posted solutions for *Average Acceleration*, *Free-Falling Up*, & *Big Ol' Duck*. (These will be posted soon. Try refreshing the page.)
  
3. Go back to the following five problems from Free Falling Up & Big Ol' Duck:
  - i. FFU Problem I: Warm-Ups (all 3 of them)
  - ii. FFU Problem IV: Chopper
  - iii. FFU Problem V: Windows 9.8
  - iv. BOD Problem IV: A Velocity/Time Graph
  - v. BOD Problem V: Big Ol' Duck

Look at the posted solution for each of these problems, take whatever notes you need. Then put the solution & your notes aside.

On a blank sheet of paper, try to solve the problem, WITHOUT looking back at your notes or the posted solution. (If you got any of these five problems PERFECTLY CORRECT the first time around, you can skip that one.)

Yes, you should HAND IN your re-try solutions to these problems.

The two problems below are EXTRA CREDIT, but they are recommended in preparation for the MIDTERM EXAM. They are each a VARIATION on a homework problem that you've already completed.

4. A cat driving a Porsche Roadster begins at rest and accelerates at a constant rate going due east. At some point in time the cat passes State Trooper James T. Flowerpot, who checks the cat's velocity with his radar gun and finds that it's going 18 m/s. Exactly one minute later the cat passes State Trooper Lisa K. Window, who also checks the cat's velocity on her radar gun and finds that it is now going 58 m/s (way over the speed limit). Your goal will be to find out how far WEST of Mr. Flowerpot the cat STARTED OUT (i.e. before he started driving). But follow these steps:
  - A. This is a variation of a homework problem. Which homework problem is it a variation of? (Draw a picture of the problem BEFORE trying to answer this question.)
  - B. Find the cat's acceleration.
  - C. Answer the ultimate question: how far WEST of Mr. Flowerpot was the cat when he started driving?
  
5. Katniss Everdeen is trying to shoot down some kind of high-tech thingy from those books I haven't read. (Ok, I confess: I did actually read the first one.) The high-tech thingy is flying DUE NORTH at 30 m/s. When the high-tech thingy is 45 meters south of her position, Katniss fires STRAIGHT UPWARDS.
  - A. If Katniss is standing 100 meters below the high-tech thingy's altitude, what was the initial upwards velocity of her arrow?
  - B. This is a variation of a homework problem. Which homework problem is it a variation of?