PHY 303K Midterm 1
Study Session Notes and Practice Problems

General concepts:

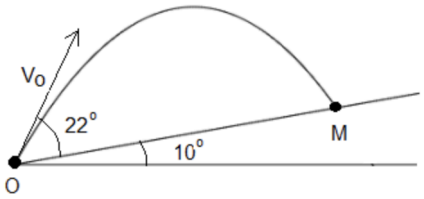
- Dimensional analysis (balancing units in equations)
- Geometry and trigonometry
- 1D and 2D motion
- Rotational motion
- Kinematic equations

Problem solving advice:

1) Identify which concept(s) apply to the question.
2) Define all of your known variables.
3) Find your "hidden" known variables.
4) Use your formula sheet and what you've learned in class to determine which equations or concepts will help you find the solution.
5) Sanity check - make sure your solution's units, magnitude, direction, etc. all make sense physically.

Practice Problems:

1) Rocket-powered sleds are used to test the human response to acceleration. If a rocket-powered sled is accelerated to a speed of 444 m/s in 1.83 seconds, then what is the distance that the sled travels?
    a) **Solution:** https://www.physicsclassroom.com/Class/1DKin/U1L6d.cfm#sol6
2) I went for a walk one day. I walked north 6.0 km at 6.0 km/h and then west 10 km at 5.0 km/hr. (This problem is deceptively easy, so be careful. Begin each part by reviewing the appropriate physical definition.) Determine…
    a) the total distance of the entire trip
    b) the total displacement of the entire trip
    c) the average speed of the entire trip
    d) the average velocity of the entire trip
    e) the average acceleration of the entire trip
    f) **Solution:** https://physics.info/kinematics-2d/practice.shtml
3) A projectile is launched from point O at an angle of 22° with an initial velocity of 15 m/s up an incline plane that makes an angle of 10° with the horizontal. The projectile hits the incline plane at point M.



a) Find the time it takes for the projectile to hit the incline plane.
b) Find the distance OM.
c) **Solution:** https://www.problemsphysics.com/mechanics/projectile/projectile_solution.html#Solution_to_Problem_2

4) Khan Academy - Dimensional analysis and units in formulas: https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:working-units/x2f8bb11595b61c86:appropriate-units/e/working-with-units
5) Khan Academy - 1D/2D motion and kinematic equations: https://www.khanacademy.org/science/ap-college-physics-1/xf557a762645cccc5:kinematics-and-introduction-to-dynamics/xf557a762645cccc5:representations-of-motion/quiz/xf557a762645cccc5:kinematics-and-introduction-to-dynamics-quiz-1?referrer=upsell