Second Chance Exercise - "Football Problem" (2D Kinematics / Projectile Motion)

This second chance exercise is for people who want to review 2D constant-acceleration kinematics.

If one of your lowest three exam problem grades was on the "football problem", you may complete it and turn it in to earn an extra homework grade, which we will help you earn 100% on. This will help your end-of-term average.

If you do this, it is due on the last day of recitation.

This exam problem covered 2D motion. In it, you needed to determine the initial velocity a football was kicked at, given how far it traveled and the time it was in the air.

1. Compare this problem to the "hiker and boot" problem from Week 3, Recitation 1 at `https://walterfreeman.github.io/phy211/recitation/week3/recitation-2D-motion.pdf`. How is it similar to that problem, and how is it different?
2. Find a problem on Homework 2 that is similar to this one. How is the same, and how is it different?
3. How do you handle the fact that in the "football problem" you already know the time of flight, rather than having to find it?
4. This question had no numbers on the exam; you were to solve it analytically. Did this pose a difficulty for you on the exam? The question you will see on the final will also have no numbers; how do you plan to ensure you are prepared for this?
5. The first practice exam is here: `https://walterfreeman.github.io/phy211/practice-exam-1.pdf`.
   (a) Find two problems on the practice exam that involve motion in two dimensions.
   (b) How is each of those problems similar to the "football problem" you had on Exam 1? How is each of them different?
6. Write a problem that evaluates students' ability to analyze motion in two dimensions, similar to the "football problem" from Exam 1 and the two problems you identified on Practice Exam 1. Just like the "football problem", this should involve calculations in terms of variables, rather than numbers. Then solve it. *(Particularly good problems here will earn extra credit!)*