Name _____ Date _____ Period _____

Projectiles - Problem Set 3

Answer the following questions on a separate sheet of paper. Show all work and circle your answer.

1. You are an artillerist in King Seal's army. After testing your catapult for a while, you find that it has an initial firing velocity of 45.0 m/s, quite consistently. During an important battle, your commander instructs you to knock down the flag on one of the battlements of Castle Darling (which, conveniently, is the same height as the release point of your catapult).
    a. Considering the fact that you can adjust the firing angle to whatever you'd like and that you really don't want to get hit with an arrow; what is the furthest that you could be and still hit the flag (neglect air resistance)?
    b. How high will your boulder be at the highest point of this trajectory?
2. Investigating an accident scene, you are asked whether or not a wrecked car was speeding before it crashed straight through the Morris Goodkind Bridge rail and into the Raritan river below. The bridge height is 4.00 m and the car landed 24.0 m horizontally from the point it left the bridge. The posted speed limit is 55 mph, or about 24.0 m/s.
3. Rather than getting out of bed, you decide to toss a shoe at your alarm clock to shut it off. Being a conscientious physics student, you decide to calculate the velocity with which you must lob the shoe, at an angle of 51.0o from the horizontal, in order for it to hit your clock 1.55 m away. The clock is on your dresser top which is 1.00 m higher than where you toss the show.
4. Standing 2.50 m away from a dartboard, Mr. McMullen tosses a dart completely horizontally at the same height as the bull's eye. If the dart hits 0.320 m below the bull's eye, how fast did Mr. McMullen toss the dart?