Physics 11 Kinematics Challenge Problems

1. The main guns of a battleship fires at a speed of 1500. m/s. If the guns fire at a elevation of 35 ° from the horizontal:
   1. How far away does the shot land? (215.5 km)
   2. What is the maximum height that the shell reaches? (15.09 km)
2. The initial velocity of an electron is -2.0 x 105 m/s. If the acceleration is 4.2 x 1014 m/s2: How far does it travel before momentarily coming to a rest? (4.762e-5 m)
3. A daring cowboy sitting on a tree wishes to drop vertically onto a horse galloping under the tree. The speed of the horse is 10.0 m/s and the distance from the limb to the saddle is 3.0 m.
   1. What must be the horizontal distance between the saddle and the limb when the cowboy makes their move? (6.12 m)
   2. How long was the cowboy in the air? (0.612 s)
4. A car and train move together along parallel paths at 25 m/s. The car undergoes a uniform acceleration of -2.5 m/s2 because of a red light and comes to rest. It remains at rest for 45 s, then accelerates back to a speed of 25 m/s at a rate of 2.5 m/s2. How far behind the train is the car when it reaches the speed of 25 m/s, assuming the train has remained at 25 m/s? (1375 m)