Projectile Motion & Chase Problems Test

Physics 41

1. A driver speeds at 50m/s. Upon passing a cop, the driver decelerates at 1.4m/s2. The cop decides to pull him over anyways, and accelerates from rest at 2.5m/s2 at the moment the speeder passes her.
   1. How long until the cop catches the speeder? 25.641s
   2. How far did the cop & speeder travel during his time? 821.83m
   3. How fast are the cop & speeder each traveling? Speeder: 14.103m/s, Cop: 64.403m/s
2. C:\Users\csmith7\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\P7YLQ31Y\MC900441886[1].wmf![](data:None;base64,)A cliff jumper wishes to dive off a 100m cliff and clear the rocks that extend 25m out from the base of the cliff. What is the minimum velocity in X the cliff diver must run at to clear the rocks? (Assume their initial velocity is only in X)  
     
     
     
     
   5.53m/s

25m

100m

1. Two men walk down the street at 2.1m/s. Man A is 50m ahead of Man B. Man A slowly accelerates at 0.3m/s2 while Man B accelerates at 1.4m/s2.
   1. How long does it take Man A to catch Man B? 8.54s
   2. How far does *Man B* run? 118.97m
   3. What is the final velocity of both Man A and Man B? A= 4.66m/s; B=14.06m/s

1. A baseball player strikes a ball 1m above the ground, giving it an initial velocity of 50m/s at an angle of 34˚ above the horizontal.
   1. How long is the ball in the air? 5.74s
   2. What is the maximum height the ball achieves? 39.88m
   3. If the fence is 245m away, is the ball a home run? No ☹ dx=237.93
2. A cannon on top of a 15m tall building fires a potato at an angle of 50˚ above the horizontal. The potato is observed to reach a height of 31m.
   1. What is the magnitude of the initial velocity? 32.18m/s
   2. How far from the base of the building did the potato land? 125.56m

I wasn’t really paying attention when I did this one though…

1. A football is struck from the ground at an angle of 40˚ above the horizontal with an initial velocity of 25m/s.
   1. How long is the football in the air? 3.28s
   2. How far does the football travel? 62.82m
   3. What is the maximum height the football reaches? 13.18m