

Phy 113: Physics of Sports
Homework Problems
Set #2: Due Monday, September 22, 2008

Note: Students are encouraged to work together and discuss the problems. However, each student must arrive at her/his own final answers. Show all your work. Simply copied homework will result in zero.

1. (10 points) Carlos Zambrano of Chicago Cubs pitched the first no hitter for the club in 36 years. He threw a 85 mph split-finger fastball to get the final out against the Huston Astros. How long did it take for the pitch to get to the home plate? Compare this to his 99 mph four-seam fastball and his 93 mph two-seam fastball.
2. (10 points) INDY500 race cars typically accelerate for 3 s (actually less than 3 s) to reach 100 mph, more than 9 s quicker than it takes a production Porsche 911 Turbo street car to reach the same speed.
 - (a) What is the acceleration during this time?
 - (b) How far does an INDY500 race car travel during this time?
3. (10 points) We've seen the highlight where some football player runs into the goalpost. Since many football players can run with a top speed of 9.5 m/s, what is the deceleration that he would experience if it took the goalpost 0.04 s to stop him? Compare this to $g = 9.8 \text{ m/s}^2$, the acceleration due to gravity.
4. (10 points) How fast will Usain Bolt be running if he accelerates from rest at 3.7 m/s^2 for a distance of 20 m?
5. (10 points) During the Men's Cross-country cycling event at the Beijing Olympic games, a cyclist decelerates for 1.2 s to a speed of 10 m/s when he saw a crash in front of him. If the deceleration was at a rate of 12.0 m/s^2 , what was his initial speed?