Honors Physics Kinematic Problem Set 1 Mr. McMullen

Name _____ Date _____ Period_____

Answer the following questions on a separate sheet of paper. Remember the steps in solving physics problems.

1. How long will it take to drive the 90 miles from Sacramento to San Francisco at the legal speed limit of 55 miles per hour? How much time would you save by driving at 70 miles per hour?
2. You are driving at 40 km/hr when a pedestrian catches your eye. You glance away for 2 seconds. How far did you travel in this time toward the person crossing the street at the intersection ahead?
3. A world class sprinter can run 100 yards in 9.4 seconds. How long would it take to run 100 meters?
4. Light travels through empty space a $3 \times 10^8$ m/s. A light year is the distance light travels in one year.
   a. How many meters in a light year?
   b. The distance from the earth to the sun is about $1.49 \times 10^8$ km. How long does it take light to travel this distance?
   c. The average radius of the earth's orbit is called one astronomical unit (1 AU). How many AU's are there in one light year?
5. On the last lap of a relay race the German runner has a 10 meter lead when the American anchor man gets the baton. The American can do the remaining 400 meters in 44.0 seconds. The German can run the final 400 meters of a relay in 45.5 seconds. Who will win the race between the two, and by how many yards?
6. A quarterback can throw a football with an average velocity of 20 meters per second. A wide receiver breaks across the middle, running 7 meters per second on a line perpendicular to the flight of the ball. If he is 20 meters downfield from the quarterback when he catches the ball, how much did the quarterback have to lead him?
7. In a 1500 meter race on a 300 meter oval track the eventual winner laps the last runner with one lap to go. The winner finishes the race in a time of 4 minutes 10 seconds. Assuming both runners run at their average speed during the final lap, what is the time for the race of the slowest runner?
8. A boy was walking across a field with his dog one day when he saw a friend approaching. The dag was excited and dashed to the friend, then back to his master, and then to the friend, and so on, never stopping. How far would you estimate the dog ran if his speed was 30 km/hr and each boy walked at 4 km/hr, starting 400 meters apart?