

Part A

You may answer as many questions as you like. Be aware that you need to finish in this block. Show as much work as you need. Partial credit will only be given when work is shown and can be understood by the teacher. Please give all final answers in three significant figures. Your grade will be calculated thusly:

$$\frac{\text{points achieved on A and B}}{\text{points attempted on A and B}} * 100 = \text{your score}$$

You only have this period to finish this section. You must do a minimum of 40 points on this section and 100 points on the two sections combined.

The numbers in parentheses after the problem indicate how many points the problem is worth. (W## H##)

A1. Mr. Corley is doing a show and tell in his small gas engines class about the viscosity of oils. He has 0.500 m long tubes filled with various oils and drops a small marble into each one. The marbles each fall with different accelerations of: 0.318 m/s^2 , 0.227 m/s^2 , 0.192 m/s^2 , and 0.057 m/s^2 . How much longer, time, does it take the slowest marble to reach the bottom of the tube as compared to the fastest marble? (W10 H20)

A2. Mr. Corley decides to get fancy in his demonstration mentioned in problem A1. He turns the tubes upside down when the fastest marble reaches the bottom of its' tube. Which marble now hits the end, which was the top, of its' tube first? (W5 H25)

A3. Ryan throws a ball upwards at 11.50 m/s. How much later should he be ready to catch the ball? (W5 H5)

SHERMAN'S LAGOON

by Jim Toomey



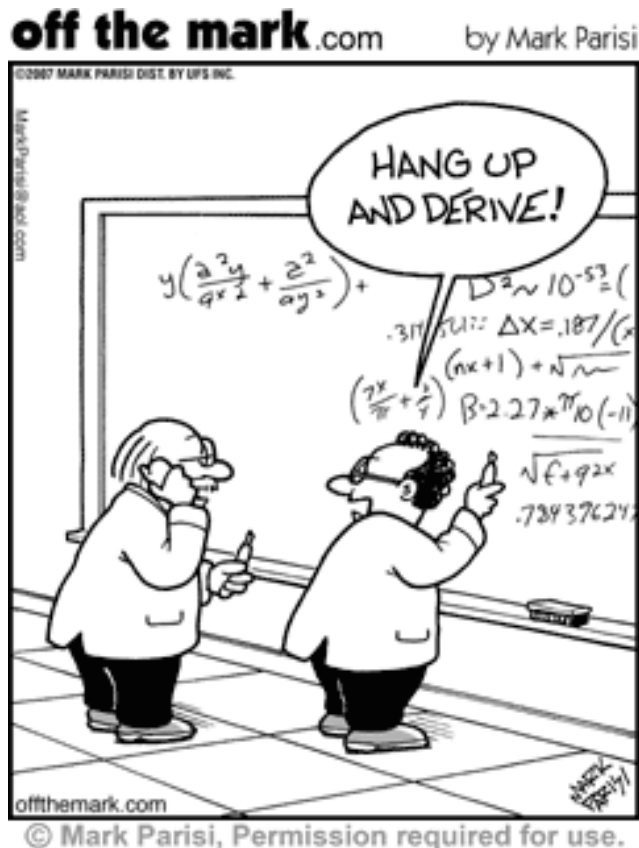
A4. Julianna is running the 200 m race this spring. She runs the race in 27.0 s. What is her average velocity and speed for the race? (You can consider the 400 m track to be a circle for this problem.) (W10 H20)

A5. Adrienne is running this winter doing the shuttle hurdles. (For those of you who do not know these hurdles run back and forth along a straight track. You need to come to a big meet and see the fun.) The track they are running on is 50.0 m long. She starts her leg just as a runner for another team starts a leg on the other end of the track. If Adrienne runs at 9.30 m/s and the other girl runs at 8.60 m/s where on the track, in respect to the finish line which Adrienne is approaching, will they cross? (W10 H20)

A6. A car is traveling at 21.7 m/s and applies its' breaks to stop in 57.3 m. What is the acceleration of the car? (W5 H5)

A7. Greg throws a rock off a 50.0 m cliff. He sees the rock hit the ground below the cliff 5.37 s later. What velocity did Greg give the rock? (W10 H10)

A8. One night while having dinner with your family your mother asks you to explain how it is possible for something thrown straight upwards to have acceleration at the top of its' path. How do you explain it to her? (W10 H0)



Part B

You may answer as many questions as you like. Be aware that you need to finish in this sitting.

You must do this section in one sitting. Do enough points so both parts combine to be a minimum of 100 points.

B1. Sara is standing on the top of a bridge that is 9.0 m above a river. She drops a badminton birdie which accelerates downwards and takes 1.92 s to hit the water. What is the acceleration of the birdie in terms of g ? (W5 H15)

B2. My son loves to run, but does not always run in a straight line. While running one day he ran straight to the swing set which was 15.0 m West and then to the slide which was 8.00 m South of the swing. I on the other hand knew that he would head for the slide and went directly there. We arrived at the slide at the same time. Who had the faster velocity? Who had the faster speed? (W20 H0)



B3. Caroline works on the fifth floor of a multistory building. One day during a break she watches as someone drops M&Ms from some where above her. Caroline knows that her window is 24.0m above the ground and notices that it takes each M&M 0.970s to fall from her window to the ground. How high above Caroline's window is the person who is dropping the candies? (W10 H20)

B4. A model rocket accelerates at 12.9 m/s^2 for 8.3 s when launched. How high does the rocket travel during its flight? (W10 H20)

B5. Your car is traveling at 20.1 m/s towards a traffic light. You are 12.5 m away when the light turns red. What acceleration does your car need to stop just before entering the intersection? (W10 H10)

B6. Joe is testing a new type of car. He is told that the car can accelerate at 7.55 m/s^2 up to a speed of 90.0 m/s. How long is it going to take Joe to travel the 1.25 km straight track if he starts from rest? (W10 H20)