

You may answer as many questions as you like. You must answer a minimum of 100 points worth of problems. Show as much work as you need on the paper provided. Do each question on a separate side of paper. 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. Box all answers. Your grade will be calculated thusly:

$$\frac{\text{points achieved}}{\text{points attempted}} * 100 = \text{your score}$$

This test is due at: 7:45 A.M on

Monday 9/22 for D Block

Tuesday 9/23 for B Block

Wednesday 9/24 for G Block

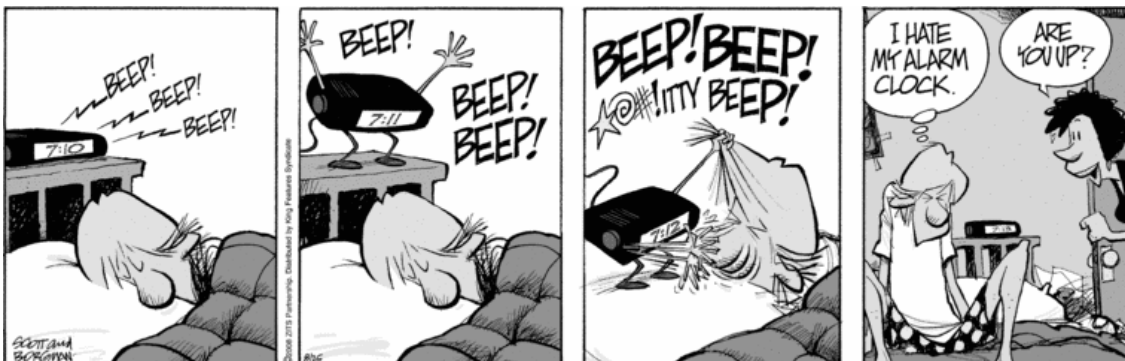
Thursday 9/25 for F & H Blocks

Do all parts of any problem you attempt. Any parts left blank will receive a grade of 0. The numbers in parentheses after the problem indicate how many points the problem is worth. (W## H##)

I have read, understood and agree to the honor statement for this test.

\_\_\_\_\_  
Signature of Student

1. Emily ran the 3200m, 8 laps around our track, in 11:29.1 minutes. What was her average velocity and speed for the race? (W10 H10)
2. A ball is thrown upwards with an initial velocity of +9.00 m/s from a high window. How long after this is a second ball dropped if they land at the same time? (W15 H15)
3. Mike is running the 200 m race for fun this spring. He runs the race in 43.0 s. What is his average velocity and speed for the race? (You can consider the 400 m track to be a circle for this problem.) (W10 H10)
4. A person starts running at a constant velocity to catch a bus that is 20.0 m away. The bus at the same instant starts to accelerate from rest at  $0.90 \text{ m/s}^2$ . The person runs just fast enough to catch the bus before it reaches its top speed. How far did the person run? (W20 H20)



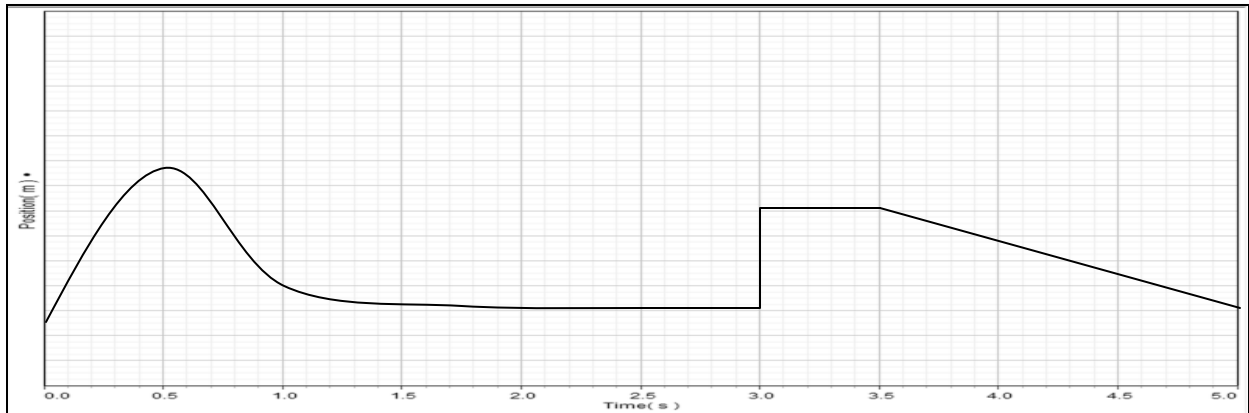
5. Tim and Rick both can run at speed  $v_r$  and walk at speed  $v_w$ , with  $v_w < v_r$ . They set off together on a journey of distance  $D$ . Rick walks half of the **distance** and runs the second half. Tim walks half of the **time** and runs the other half.

- Draw a graph showing the positions of both Tim and Rick versus time. (10)
- Write two sentences explaining who wins and why. (10)
- How long does it take Rick to cover the distance  $D$ ? (15)
- Find Rick's average speed for covering the distance  $D$ . (10)
- How long does it take Tim to cover the distance? (15)

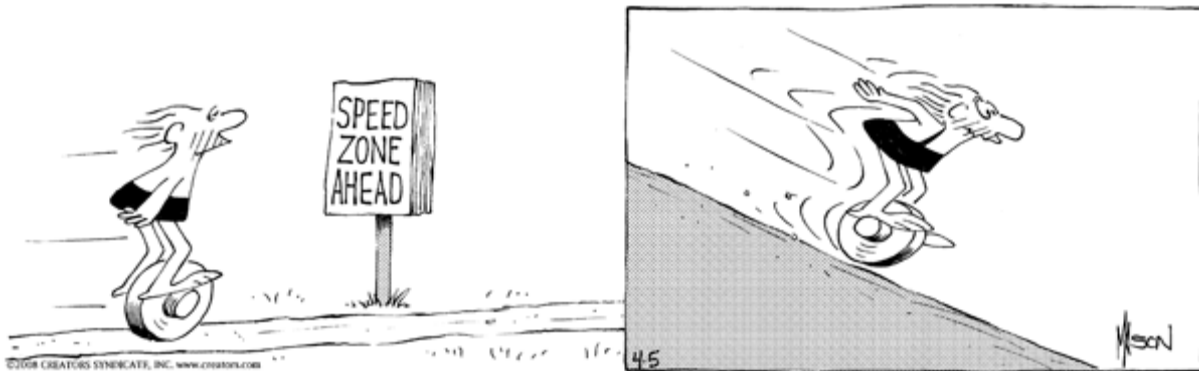
6. Zoe kicks a ball up such that it travels straight up in the air to a height of 9.54 m. How with what speed did she kick the ball? (W5 H5)

7. Bianca is chasing Deanna one day down a straight street. Both girls started from rest but Deanna was 7.20 m in front of Bianca. Deanna can accelerate at  $0.6 \text{ m/s}^2$  to a top speed of 6.70 m/s. Bianca can accelerate at  $0.65 \text{ m/s}^2$  to a top speed of 7.45 m/s. How far does each of the girls run before Bianca catches Deanna? (W10 H20)

8. Sketch a velocity-time graph and an acceleration-time graph for the motion shown on the graph below. (W0 H20)



9. Explain why in the second panel of this cartoon Peter is entering a “Speed Zone.” (W10 H0)



10. A car drives down a straight road from mile marker 13 to mile marker 27.4 and then back to mile marker 9.7. What is the displacement and distance traveled by the car during this trip? (W5 H5)

11. Brian drops his brother's guitar out of a high window. How long does it take the guitar to reach a speed of 12.0 m/s? (W5 H5)

12. Dean drops a rock off a cliff that is 43.0 m above a river. Taylor throws another rock downwards 1.80 s later. What velocity did Taylor give her rock if the two rocks hit the river at the same time? (W10 H10)

13. Zach is driving at 12.0 m/s one day down the road when a flock of turkeys crosses the road a distance of 9.00 m in front of him. What acceleration does he need to apply to his car to stop 1.5 m before the flock? (W10 H10)

14. A helium balloon is released and rises with an acceleration of  $+0.2 \text{ m/s}^2$ . How high is the balloon after 2.5 minutes if this acceleration stays constant? (W5 H5)

