PHYSICS 11 KINEMATICS WORKSHEET 3

Read over your notes kinematics formulas, and refer to pp 54-56, 63-68 of the text to answer the following questions. Assume g = 9.8 m/s^2.

1. A flower pot falls from a third storey window, 17.0 m above a sidewalk.
   a) With what speed does the pot hit the path?
   b) How long does it take for the pot to hit the path?

2. A penknife drops out of a sailor's hand while she is at the top of a mast. She times the knife's drop to the deck and measures 1.3 s.
   a) How high was she up the mast?
   b) With what speed did the knife hit the deck?
   c) What was the knife's average speed?

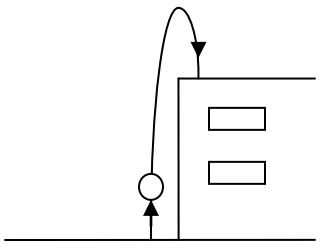
3. Our hero, Phreddie Physics, visits Vancouver so he can drop a small iron bolt from Lion's Gate bridge to the water 65 m below.
   a) With what speed will the bolt hit the water?
   b) What should be the bolt's average velocity while dropping?
   c) How long will the drop take?

4. Dirk Doofus belly-flops straight down from a 3.0-metre diving board into the water.
   a) How long is he airborne?
   b) With what speed does Dirk hit the ground?
   c) Will this landing be painful?

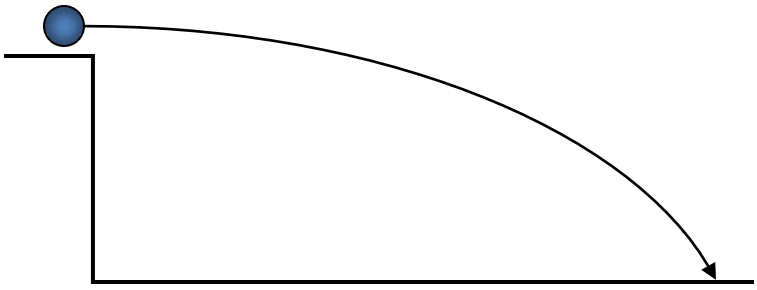
5. A cowboy fires a bullet straight up from ground level at a speed of 182 m/s.
   a) How high does the bullet go?
   b) How long does it take for the bullet to stop?
   c) When is the bullet's acceleration equal to zero?
   d) What is the bullet's total time in the air?

6. A car moving at 30 m/s makes a head-on collision with a stone wall. From what height would the car have to fall in order to make an equally hard collision with the ground (i.e., hit at the same speed)?

7. A baseball is tossed from street level by a student straight up at a speed of 25.3 m/s. After reaching maximum height, it is caught by another student on the roof of a building, 17.4 m above the street (see side picture). How long does this take?



8. An object is fired horizontally from the top of a cliff, and lands on the ground at some distance away from the base of the cliff.



a) List all the horizontal information that is known about the object.
b) List all vertical information known about this object.

9. Homer Simpson attempts to cross a 27 m-deep canyon on Bart's skateboard. He takes off horizontally from one side at 12.3 m/s but ends up falling to the canyon floor.
a) How long is he airborne?
b) How far from the cliff does he land?

10. A student throws a baseball horizontally from the balcony of the school. If the balcony is 5.6 m above the ground, and the ball lands on the ground 25 m from the base of the school, with what initial speed did the student throw the baseball?

1. a) 19 m/s b) 1.9 s 2. a) 8.3 m b) 12 m/s c) 6.0 m/s 3. a) 35 m/s b) 18 m/s c) 3.6 s
4. a) 0.78 s b) 7.6 m/s c) u-betcha 5. a) 1.69 x 10^3 m b) 18.6 s c) never! (explain) d) 37.2 s 6. 47 m 7. 4.34 s
8. a) a = 0, $v_i = v_f = v_{av}$ = constant b) $v_i = 0$, a = 9.8 m/s^2 down 9. a) 2.4 s b) 29 m 10. 23 m/s