Kinematic Word Problems
Worksheet #3

1. The brakes are applied on a car travelling at 30. m/s. The car stops in 3.0 s.
   a) What is its displacement during this time? (45 m)
   b) What is the car's average acceleration? (-10. m/s^2)

2. A skier accelerates at 1.20 m/s^2 down an icy slope, starting from 2.0 m/s. What is her displacement in...
   (a) 5.0 s?   (b) 10.0 s ?   and (c) 15.0 s ? (25m , 80 m, 165 m)

3. A motorcycle stunt man accelerates from rest to a maximum velocity of 35.2 m/s at the top of the take-off ramp, then swoops up and over 20 cars. Calculate how long it takes him to accelerate, at an acceleration of 8.8 m/s^2. (4.0 s)

4. A ball accelerates steadily down a ramp, starting from rest. It goes 2.0 m in 4.0 s.
   a) What is its average velocity? (0.50 m/s)
   b) What is its final velocity? (1.0 m/s)
   c) What is its acceleration? (0.25 m/s^2)

5. The acceleration due to gravity on the moon is about 1.6 m/s^2. How long would it take a hammer to hit the surface of the moon, if it was dropped from a height of 1.8 m? (1.5 s)

6. The CN Tower in Toronto is 533.33 m high.
   a) How long would it take a rock, dropped from the top, to reach the ground? (10.4 s)
   b) How fast would the rack be moving as it hit the ground (in metres per second and kilometres per hour)? (-102 m/s, -3.7×10^2 km/h)
   c) Would the rock actually reach the speed calculated in b)? Discuss.

7. A college student wants to toss a textbook to his roommate who is leaning out of the window directly above him. He throws the book up with a velocity of 8.0 m/s. The roommate catches the book while it is travelling 3.0 m/s [upwards].
   a) How long was the book in the air? (0.51 s)
   b) How far did the book travel in the upward direction? (2.8 m)

8. a) A stone is fired straight up with a velocity of 29.4 m/s. Find its displacement and velocity at 1.0 s intervals between 0 and 6.0 s.
   b) using the answers for a) construct position-time and velocity-time graphs for the stone.

9. A girl throws a pebble into a deep well at 4.0 m/s [down]. It hits the water in 2.0 s.
   a) How far below the ground is the water's surface? (-28 m)
   b) What is the pebble's average velocity? (-14 m/s)
   c) How soon after it is thrown does the pebble actually acquire the velocity calculated in b)? (1.0 s)
   d) What is the velocity of the pebble when it hits the water? (-24 m/s)