**KINEMATICS REVIEW**

1. How far would an oxygen molecule travel in 1.52 hours at a velocity of 460 m/s?
2. A car goes 30 km in 0.70 h, and travels another 20 km on 0.50 h in the same direction, and finally travels another 10 km in 0.30 h in the same direction. What was the average velocity for the trip?
3. Bob runs 2 laps around a 400m track in 158 s. What is his
4. average speed
5. average velocity
6. John-Boy travels at an average of speed of 83 km/h to Burnaby and back. If it takes him a total of 50 minutes, how far is it to Burnaby?
7. Given the following data of a lab cart, how far does the cart travel between 3.0 and 4.0 s?

 TIME (s) 0 1.0 2.0 3.0 4.0

 VELOCITY (m/s) 0 0.80 1.6 2.4 3.2

1. A cart travelling from rest accelerates at 3.0 m/s² for 8.0 s.
2. How fast is the car travelling after 8.0 s?
3. How far has the cart travelled?
4. A gun fires a bullet which is accelerated in a gun barrel 1.0 m long. The bullet leaves the barrel at 600.0 m/s. Calculate the acceleration of the bullet.
5. Describe a situation where an object accelerates west but has a velocity east. Be specific.
6. A physics student skis down a 180 m long hill with an initial velocity of 2.0 m/s and reaches the bottom of the hill in 0.5 minutes.
7. Determine the velocity at the bottom of the hill.
8. The ski run at the bottom of the hill leads onto a level frozen lake. If the student continues his run on the ice and the friction causes a deceleration of 1.5 m/s², determine whether or not the skier will fall into a hole exactly 35 m from the bottom of the hill.
9. An aircraft starts from rest and accelerates at a constant rate down the runway.
10. After 12 s its speed is 36 m/s. What is the acceleration?
11. How fast is the plane moving after 15 s?
12. How far did it go down the runway in 15 s?
13. A car was travelling at 30.0 m/s when a small child darted onto the road 60.0 m away. Reacting instantly the driver slams on the brakes.
14. While coming to a stop from a speed of 30.0 m/s, what will be the car’s average speed?
15. How much time would it take to stop if it was able to stop in exactly 60.0 m?
16. What is the car’s minimum deceleration rate to stop in 60.0 m?
17. A bean bag is launched vertically upwards at 29.4 m/s
18. How long does it take to reach the maximum height (apex)
19. How long is it in the air?
20. How high did it rise?
21. On the way down it lands on a seagull. If it happens 5.00 sec after the launch point, how high is the bird flying?
22. A ball is thrown vertically downward from the top of a 250 m building. It’s initial velocity was 4.0 m/s.
23. How long before it hits the ground?
24. The time required to reach a velocity of 30. m/s down.
25. A ball is thrown vertically upward. The ball is 3.0 m above the ground and travelling at 15 m/s the moment it is released. It reaches some maximum height and then falls to the ground.
26. What is the maximum height above the ground?
27. What is the impact velocity of the ball with the ground?
28. At what time(s) does the ball have a speed of 13 m/s?

15. In order to use the 3 kinematics equations, the object moving must have a constant \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.