Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Physics 11

**Worksheet 2.9**

**Extra Practice**

1. A baseball pitcher makes a big mistake and throws the ball straight up. If it reaches a maximum height of 15 m, find…
   1. The initial velocity he threw it up with.
   2. The total time the ball spends in the air.
   3. The ball’s average velocity on the way up to the top.
   4. The ball’s velocities when its displacement is equal to 8 m.
   5. The times (there are more than one) when the ball is 8 m above the ground.
2. A ball bearing rolls down a very long slope, starting from rest. After 3 s the ball has traveled 3 m. The ball continues on down the slope. Determine…
   1. The ball’s acceleration.
   2. The velocity of the ball after 6 s.
   3. The ball’s displacement after 4 s.
3. Papa Smurf is thrown down at 20 m/s off of a 100 m cliff. Find…
   1. The velocity at which he hits the ground.
   2. The time between the throw and the impact.
   3. His displacement when his velocity is -34.7 m/s.
4. A rifle bullet accelerates through the length of a gun barrel (0.75 m) in 0.005 s as it’s pushed by the expanding hot gasses from the explosion. Find
   1. The bullet’s acceleration in the gun barrel.
   2. The velocity at which the bullet leaves the barrel.
5. A stone is dropped off of a cliff. 2 s later a second stone is dropped off of the same cliff. How far apart are they when the first stone reaches a velocity of -40 m/s?
6. A helicopter is ascending vertically with a velocity of 8 m/s upwards. At the instant it reaches a height of 120 m, a package is dropped out of the door. How much time passes before the package hits the ground?
7. The Jolly Green Giant throws his mountain bike upwards at 15 m/s on the edge of a 40 m cliff.
   1. How high above him does the bike fly?
   2. When does the bike pass him on the way down?
   3. At what velocity does it smite terra firma?
   4. How much time passes between hurl and destruction?
8. Superman tosses a 10 storey building upwards at 20 m/s (has he turned evil?) on the edge of a 300 m cliff. Determine…
   1. When (there are two times) the building’s displacement is equal to 10 m.
   2. When the building’s displacement is equal to -50 m.
   3. When the unfortunate tower hits the ground below.
   4. At what speed the building meets the ground.
9. The newly-revamped physicsmobile is going 200 km/h when it blows by the chemwagon, which is going only 100 km/h. The chemwagon immediately accelerates as it is passed, reaching 220 km/h in 10 seconds, and maintains this new velocity. The innocent physicsmobile continues on at 200 km/h, unaware of the madman approaching from behind.
   1. How far apart are the cars when the chemwagon reaches 220 km/h?
   2. How long, from the moment it is passed, does it take the chemwagon to pass the physicsmobile back.
   3. Draw v vs. t graphs for both cars on the same axes.

Answers

1. a) 17 m/s b) 3.5 s c) 8.6 m/s d) ± 12 m/s e) 0.56 s, 2.9 s
2. a) 0.67 m/s2 down the slope b) 4.0 m/s down the slope c) 5.3 m down the slope
3. a) -49 m/s b) 2.9 s c) -41 m
4. a) 60,000 m/s2 b) 300 m/s
5. 60 m
6. 5.8 s
7. a) 12 m b) 3.1 s c) -32 m/s d) 4.8 s
8. a) 0.6 s, 3.5 s b) 5.8 s c) 10 s d) 79 m/s
9. a) 111 m b) 30 s