Physics: 1-D Motion Supplemental (i.e., NOT for a grade) Problems

(Answers are at the bottom.)

1. A sports car traveling at 29.8 m/s northwest slows at a constant rate to a stop in 8.0 s. Find the displacement.

2. A toy car has an initial velocity of +5.0 m/s (to the right) and experiences an acceleration of +2.0 m/s^2. Find the speed after 6.0 s.

3. A soccer ball moves horizontally with a velocity of +3.0 m/s. It then undergoes a constant negative acceleration so that, after 4.0 s, it is moving +1.5 m/s. Find the distance traveled.

4. A pebble falls from an already-airborne hot-air balloon that is at a constant altitude. After 3.00 seconds, how fast is the pebble moving AND how far has it fallen?

5. A rock is thrown straight upward with an initial velocity of +28 m/s. To what height does it rise?

6. Assume that human reaction time is 0.20 s. If your lab partner holds a meter stick between your finger and thumb and releases it without warning, how far will the meter stick have fallen before you catch it?

7. A rock is thrown downward from the top of a cliff with an initial speed of 12 m/s. If the rock hits the ground after 2.0 s, what is the height of the cliff?

8. A ball is thrown straight upward with an initial velocity of 21.5 m/s. What is the ball's displacement after 1.00 s?

9. A coin is dropped from rest from the top of a tower. It hits the ground after 1.50 s. With what speed does the coin hit the ground?

10. From a balcony, a rock is thrown straight upward with an initial velocity of +21.7 m/s. The balcony is 8.45 m above the ground. If the rock just misses the balcony on the way back down, with what speed will it hit the ground?

Answers:

1. 120 m NW
2. +17.0 m/s (to the right)
3. 9.0 m
4. 29.4 m/s AND 44.1 m
5. 40. m
6. 0.20 m
7. 44 m
8. 16.6 m upward
9. 14.7 m/s
10. 25.2 m/s