

Name: _____

Class Period: _____

AP Physics: Kinematics

Average Speed & Velocity/Kinematic Equations Homework

Conceptual Questions

1. Can an object have a changing speed if its velocity is constant? Can an object have a changing velocity if its speed is constant? Explain your answers.
2. What motion results if you have a positive velocity and a negative acceleration?
3. What motion results if you have a negative velocity and a negative acceleration?

Mathematical Questions

4. Calculate the average speed and average velocity (in SI units) of a complete round-trip in which the outgoing 250 km is covered at 95 km/h, followed by a 1.00 hour lunch break, and the return 250 km is covered at 55 km/h.
5. An object moving in a positive x-direction passes the origin at $t = 0$ s. Between $t = 0$ s and $t = 1$ s, the object has a constant velocity of 24 m/s. At $t = 1$ s, the object is given a constant acceleration of 6.0 m/s^2 in a negative x-direction. The position of the object at $t = 11$ s is... (show your work for partial credit)
 - A. +99 m
 - B. +36 m
 - C. -36 m
 - D. -99 m

***See back for final question**

6. A speeding driver flies along a straight, desert road going 120.0 km/h and passes a stationary police officer. The officer immediately takes off in pursuit with a constant acceleration of 2.78 m/s^2 . How much time will it take for the police officer to catch the speeder?
7. A person driving her car at 45.0 km/h approaches an intersection just as the light turns yellow. She knows the yellow light only lasts 2.00 s before turning red and she is 28.0 m away from the closest side of the intersection. The intersection itself is 15.0 m wide. Her car's maximum deceleration is -5.80 m/s^2 whereas it can accelerate from 45.0 km/h to 65.0 km/h in 6.00 s. Should she try to stop or try to make it through the intersection? Ignore the length of her car and her reaction time.