

Name: _____

Class Period: _____

Honors Physics:

Problem Set – One Dimensional Kinematics

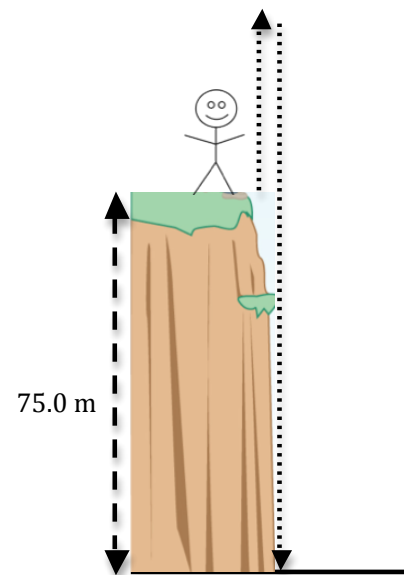
Please work on a separate piece of paper. * Indicates a challenge problem.

Conceptual Questions:

1. What is the difference between average and instantaneous velocity? How can you calculate either one?
2. What motion do you get with a positive velocity and a negative acceleration?
3. What motion do you get with a negative velocity and a positive acceleration?
4. Consider, when you throw an object into the air and it reaches its highest point, what kind of velocity does it have (positive, negative, or zero)? What kind of acceleration does it have (positive, negative, or zero)?

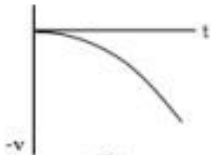
Mathematical Questions:

5. A cyclist bikes up a mountain (10.0 km) with an average speed of 2.78 m/s. He rests at the top of the mountain for 5.00 minutes, then bikes down the mountain (10.0 km) with an average speed of 5.56 m/s. What is the cyclist's average speed for the entire trip? Express your answer in SI Units.
6. A rocket moves upward, starting from rest with an acceleration of 13.2 m/s^2 for a time of 3.98 s.
 - A. How far does the rocket travel during this time?
 - B. What is the final velocity of the rocket after 3.98 s?
 - C. After the 3.98 s, the engines shut off. The rocket with its velocity from part B, begins to slow down due to gravity. How much higher does the rocket rise before it has a velocity of 0 m/s?
7. A stone is thrown vertically upward with an initial velocity of 12.0 m/s on the edge of a cliff that is 75.0 m high.
 - A. How long does it take the stone to reach the bottom of the cliff?
 - B. What is the final velocity of the stone just before it hits the ground?
8. A car moves forward, starting from rest, and travels for 5.00 s with an acceleration of 1.50 m/s^2 . The driver then applies the brakes, which provide an acceleration of -2.00 m/s^2 . The brakes are applied for 3.00 s.
 - A. What is the maximum positive velocity the car attained?
 - B. What is the total displacement through the entire 8.00 s?

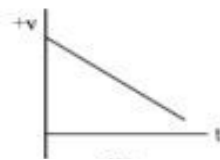


9. All graphs shown below are **VELOCITY VS TIME** graphs. Please identify the following:

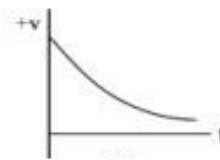
- A. Which graphs show positive velocities?
- B. Which graphs show negative velocities?
- C. Which graphs show positive accelerations?
- D. Which graphs show negative accelerations?



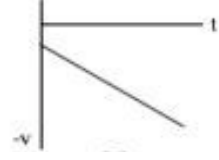
A



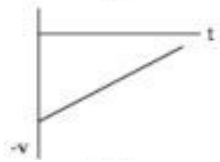
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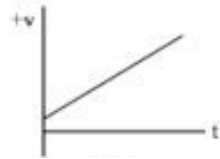
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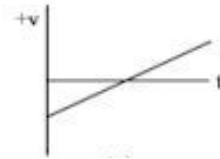
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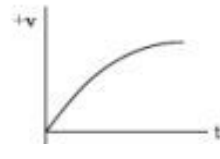
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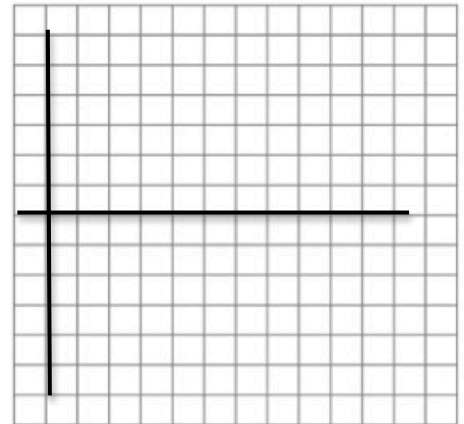
G



H

10. Sketch the position vs. time graph for an object that does the following.

- A. The object begins at a position $x = 1.0$ m and remains stationary for the first 2 seconds.
- B. The object then accelerates forward to a position $x = 5.0$ m in 2 more seconds.
- C. The object then continues forward with a constant velocity to a position of $x = 9.0$ m in 1 more second.



11. Based on the position graph sketched in question 10, please sketch the velocity and acceleration vs. time graphs.

