

## Honors Physics 1D Kinematics HW, part 2 (Homework)

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1.

A ball is thrown vertically upward with a speed of  $12.0$  m/s.

- How high does it rise?
- How long does it take to reach its highest point?
- How long does it take to hit the ground after it reaches its highest point?
- What is its speed when it returns to the level from which it started?

2.

A small mailbag is released from a helicopter that is descending steadily at  $3.00$  m/s. After  $2.00$  s,

- what is the speed of the mailbag, and
- how far is it below the helicopter?
- What are your answers to parts (a) and (b) if the helicopter is rising steadily at  $3.00$  m/s?

3.

A ball thrown vertically upward is caught by the thrower after  $10.00$  s. Find

- the initial velocity of the ball and
- the maximum height it reaches.

4.

A parachutist with a camera, both descending at a speed of  $15$  m/s, releases that camera at an altitude of  $140$  m.

- How long does it take the camera to reach the ground?
- What is the velocity of the camera just before it hits the ground?

5.

A bullet is fired through a board  $7.0$  cm thick in such a way that the bullet's line of motion is perpendicular to the face of the board. If the initial speed of the bullet is  $350$  m/s and it emerges from the other side of the board with a speed of  $250$  m/s, find

- the acceleration of the bullet as it passes through the board and
- the total time the bullet is in contact with the board.

6.

A ranger in a national park is driving at  $34.0$  mi/h when a deer jumps into the road  $260$  ft ahead of the vehicle. After a reaction time of  $t$ , the ranger applies the brakes to produce an acceleration of  $a = -9.00$  ft/s<sup>2</sup>. What is the maximum reaction time allowed if she is to avoid hitting the deer?