

## Projectile Motion Master Assignment

**Due Date 01/09/09**

### **Mastery Test Dates during 8<sup>th</sup> period: The two 8<sup>th</sup> periods after the 9th**

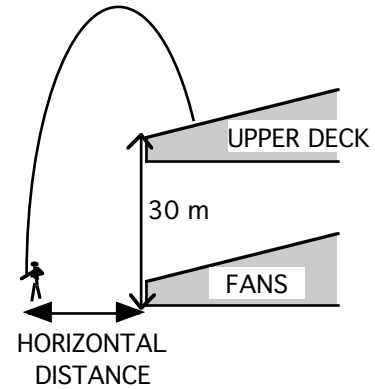
1. In a football quarterback throws a ball to a receiver.
  - The quarterback takes the hike from the center.
  - 3.0 seconds later he passes the ball with a velocity of 20 m/s at a  $30^\circ$  angle with the ground.
    - a. How high did the ball travel?
    - b. How long was the ball in the air?
    - c. How far down the field did the ball travel?
    - d. What speed will the ball hit the ground with and at what angle?
    - e. With what average velocity will the receiver have to run with in order to catch the ball the moment it gets to the ground?

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2. In a baseball game a batter pops a ball up at a  $70^\circ$  angle with a velocity of  $50 \text{ m/s}$  towards the bleachers behind him. The ball lands on the second seating deck  $30 \text{ m}$  high.
- How high did the ball travel?
  - How long was the ball in the air?
  - How far horizontally did the ball travel?
  - What speed will the ball hit the deck with and at what angle?

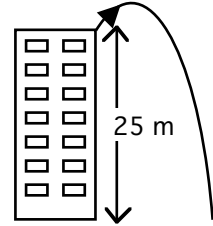


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3. A boy throws a snowball off a building 25 m high. He throws the ball upwards at 50 m/s at an angle of  $60^\circ$ .
- How high did the snowball travel?
  - How long was the snowball in the air?
  - How far horizontally did the snowball travel?
  - What speed will the snowball hit the ground with and at what angle?

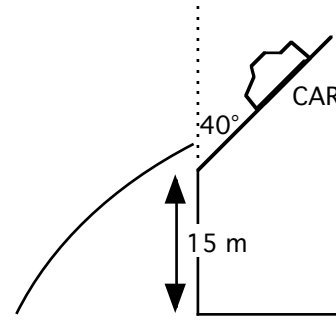


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4. A car slides down a cliff. The slope of the cliff is  $40^\circ$  with the VERTICAL. The car slides off the cliff at  $20 \text{ m/s}$ .
- How long was the car in the air?
  - How far horizontally did the car travel?
  - What speed will the car hit the ground with and at what angle?



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5. During a motorcycle stunt, Dangerous Daredevil Dan jumps off a ramp at  $15^\circ$  with a speed of 48 m/s. He lands 3.00 m below his starting height.
  - a. How much time did it take to reach apogee?
  - b. How much time did it take to land?
  - c. How much time did it take for him to pass a height that is 5 meters above the starting height and before he reaches the apogee?

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6. A car drive off the edge of a cliff at 22m/s. the car leaves the cliff while traveling horizontally. The car is in the air for exactly 3 seconds.
  - a. How far away, horizontally, was the car when it impacted the ground?
  - b. What was the car's impact velocity? (magnitude and direction)
  - c. How high was the cliff's edge?