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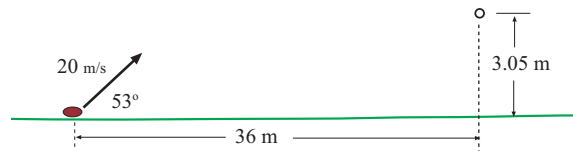
Phys 2010 (NSCC), Fall 2005
Problem Set #4

1. A student stands at the edge of a cliff and throws a stone horizontally over the edge with a speed of $18.0 \frac{\text{m}}{\text{s}}$. The cliff is 50.0 m above a flat horizontal beach.

How long after being released does the stone strike the beach below the cliff?

2. In problem 1, what is the speed of the stone when it lands? (Hint: What are the values of v_x and v_y when it lands?)

3. A place kicker kicks the football from a point 36.0 m from the goal; the ball needs to clear the crossbar, which is 3.05 m high! When kicked, the ball leaves the ground with a speed of $20.0 \frac{\text{m}}{\text{s}}$ at an angle of 53° from the horizontal.



At what time t was the ball directly over or under the crossbar?

4. In problem 3, what was the height of the ball at the time t that you found? The the ball make it over the crossbar?

5. When a projectile (which is fired from ground level and lands at ground level) is fired at an angle of 40.0° , it has a range of 130 m. With what speed was this projectile fired?

6. In problem 5, how long was the projectile in flight?

7. A 2000-kg car is slowed down uniformly from $20.0 \frac{\text{m}}{\text{s}}$ to $5.00 \frac{\text{m}}{\text{s}}$ in 4.00 s. (a) What average force acted on the car during that time? (b) How far did the car travel in that time?

8. A 5.0-kg bucket of water is raised from a well by a rope. If the upward acceleration of the bucket is $3.0 \frac{\text{m}}{\text{s}^2}$, find the force exerted by the rope on the bucket.