Projectile Motion - Quiz 5.0

1. Our equations for projectile motion are not quite accurate because:
(a) wind and aerodynamics are often significant factors (b) air resistance can be a significant retarding force (c) there is some curvature to the earth's surface (d) the earth is a spinning and hence accelerated reference frame (e) all of the above

2. If a projectile is fired at an angle of 35 degrees with respect to the ground, at its maximum height:
(a) its speed is zero (b) its velocity is zero (c) its vertical speed is zero (d) its horizontal speed is zero (e) all of the above.

<u>For our problem solving work below assume negligible air resistance.</u>

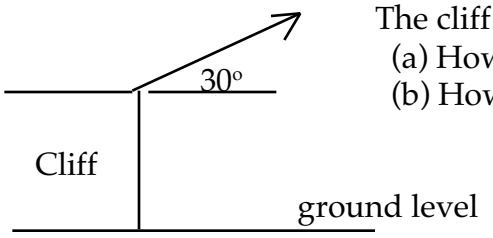
3. A basketball is rolled at 5 ft/s off a roof top 10 ft above the ground.
(a) How long is it in the air? (b) How far from the base of the building does it land?

4. A rugby ball is kicked from ground level with an initial speed of 20 m/s at a 20^o angle.
(a) How long is the ball in the air? (b) How far away does it land?

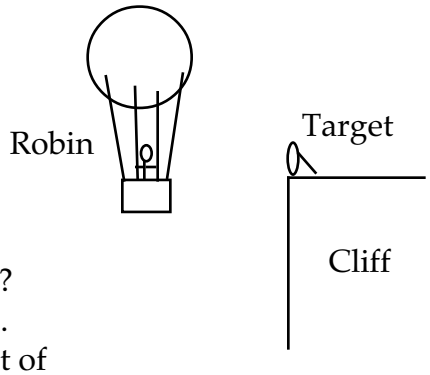
5. Nick is in an airplane flying horizontally with a speed of 805 km/h (or 224 m/s). The plane's altitude is 10,000 m and Nick accidentally falls out of the plane. By chance there is a newly fertilized lawn 10 km away (along the ground) straight ahead. Will Nick land in it?

6. A soccer ball is kicked with an initial speed of 30 m/s at a 37^o angle with the ground.
(a) How far does the ball travel horizontally? (b) What is the ball's maximum height?

7. Odie is sent flying at a 30 degree angle above the horizontal. The cliff is 14.7 m high and his initial speed is 19.6 m/s.
(a) How long is Odie in the air?
(b) How far from the base of the cliff does he land?



8. Robin Hood is riding in a balloon which is rising at 48 ft/s. (This is an American movie star.) He spots a target 200 ft away on the top of a cliff. Robin aims horizontally and fires his usual 100 ft/s arrow.
(a) Does it hit the target? (b) Where does the arrow land?



9. A tennis ball is tossed horizontally off a cliff at 10 m/s. It lands 50 m from the base of the cliff. What is the height of the cliff?

10. A truck is moving down a straight road at 40 m/s with a cannon aimed vertically upward. The muzzle speed of the cannon ball is known to be 30 m/s.
(a) If the cannon is fired while the truck is moving, how long is the ball in the air?
(b) How far does the truck travel before it explodes?
(c) What is the initial speed and (angular) direction of the cannon ball according to a person viewing all of this from the side of the road?