

## 4 Projectile Motion

Worksheet B: *When Projectiles Strike*

Name \_\_\_\_\_

AP Physics B

Assume air resistance is negligible and that  $g = -9.80 \text{ m/s}^2$  (or  $-32.2 \text{ ft/s}^2$ ). Show your work on this paper. Work metric problems in meters and seconds and U.S. Customary System problems in feet and seconds.

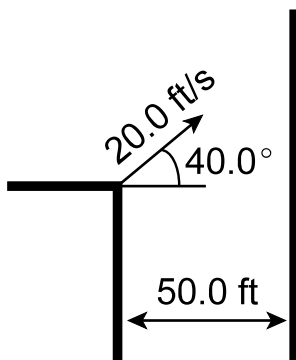
1. An object, projected upward at an angle of  $30.0^\circ$  with the horizontal, has an initial speed of 128 ft/s.

a) In how many seconds will it reach the ground?

b) How far from the point of projection will it strike?

c) Find the angle it strikes the ground at using  $\arctan\left(\frac{v_{f_v}}{v_{f_H}}\right)$  *441 feet*

2. A ball is thrown from the top of one building toward a tall building 50.0 feet away. The initial velocity of the ball is 20.0 ft/s at  $40.0^\circ$  above the horizontal. How far above or below its original level will the ball strike the opposite wall? *130 feet below*



3. A projectile is fired upward from the top edge of a vertical 200 meter cliff above a valley. Its initial velocity is 60.0 m/s at  $60.0^\circ$  above the horizontal. Calculate the distance from the base of the cliff to the impact point on the valley floor. *408 meters*

4. A plane with a speed of 105 m/s, diving at an angle of  $60.0^\circ$  with the vertical, releases a projectile at an altitude of 875 m. How far does the projectile travel horizontally before striking the ground below?

5. A marble with a speed of 15.0 cm/s rolls off the edge of a table 65.0 cm high. How far, horizontally, from the table edge does the marble strike the floor?