

### **Projectile Motion Worksheet**

- 1) A ball rolls with a speed of 2.0 m/s across a level table that is 1.0 m above the floor. Upon reaching the edge of the table, it follows a parabolic path to the floor. How far along the floor is the landing spot from the table? [0.90 m]
- 2) A rescue pilot drops a survival kit while her plane is flying at an altitude of 2000.0 m with a forward velocity of 100.0 m/s. If air friction is disregarded, how far in advance of the starving explorer's drop zone should she release the package? [2020 m]
- 3) A rifle is fired horizontally and travels 200.0 m [E]. The rifle barrel is 1.90 m from the ground. What speed must the bullet have been travelling at? Ignore friction. [321 m/s]
- 4) A skier leaves the horizontal end of a ramp with a velocity of 25.0 m/s [E] and lands 70.0 m from the base of the ramp. How high is the end of the ramp from the ground? [38.5 m]
- 5) An astronaut stands on the edge of a lunar crater and throws a half-eaten Twinkie™ horizontally with a velocity of 5.00 m/s. The floor of the crater is 100.0 m below the astronaut. What horizontal distance will the Twinkie™ travel before hitting the floor of the crater? (The acceleration of gravity on the moon is  $1/6^{\text{th}}$  that of the Earth). [55.3 m]
- 6) A baseball player leads off the game and hits a long home run. The ball leaves the bat at an angle of  $30.0^\circ$  from the horizontal with a velocity of 40.0 m/s. How far will it travel in the air? [141 m]
- 7) A golfer is teeing off on a 170.0 m long par 3 hole. The ball leaves with a velocity of 40.0 m/s at  $50.0^\circ$  to the horizontal. Assuming that she hits the ball on a direct path to the hole, how far from the hole will the ball land (no bounces or rolls)? [9.38 m]
- 8) A punter in a football game kicks a ball from the goal line at  $60.0^\circ$  from the horizontal at 25.0 m/s.
  - a) What is the hang time of the punt? [4.41 s]
  - b) How far down field does the ball land? [55.2 m]
- 9) A cannon fires a cannonball 500.0 m downrange when set at a  $45.0^\circ$  angle. At what velocity does the cannonball leave the cannon? [70.0 m/s at  $45.0^\circ$ ]
- 10) A lovesick lad wants to throw a bag of candy and love notes into the open window of his girlfriend's bedroom 10.0 m above. Assuming it just reaches the window, he throws the love gifts at  $60.0^\circ$  to the ground:
  - a) At what velocity should she throw the bag? [16.2 m/s at  $60.0^\circ$  to the ground]
  - b) How far from the house is he standing when he throws the bag? [11.5 m]