

Projectile Review

1. A ball rolls off a 1.0 m high table and lands on the floor, 3.0 m away from the table.
 - a. How long is the ball in the air? [$.45\text{s}$]
 - b. With what horizontal velocity did the ball roll off the table? [6.7m/s]
 - c. What is the vertical velocity of the ball just before it hits the floor? [-4.5m/s]
 - d. What is the horizontal velocity of the ball just before it hits the floor? [6.7m/s]
2. A carpenter tosses a shingle off a 9.4 m high roof, giving it an initial horizontal velocity of 7.2 m/s .
 - (a) What is the final vertical velocity of the shingle? [-13.7m/s]
 - (b) How long does it take to reach the ground? [1.37s]
 - (c) How far does it move horizontally in this time? [9.9m]
3. A tiger leaps horizontally from a 12 m high rock with a speed of 4.5 m/s . How far from the base of the rock will she land? [6.97m]
4. An emergency relief plane is dropping a care package from a plane to a group of medical personnel working for a relief agency. The plane will be moving horizontally at a ground speed of 40.2 m/s . The package will be dropped a horizontal distance of 600m from the intended target location. At what altitude above the pond must the plane be flying to successfully accomplish this feat? [1110m] How fast in the y was the package moving? [-149m/s]. How fast in the x was the package moving? [40.2m/s]
5. The fastest bowler in cricket can throw at 44.8m/s . If the ball is released 2.3m above the ground and perfectly horizontally how far will the ball travel before it hits the ground? [30.5m]
6. You are on a building that is 125m above the ground, you throw a ball into a trash can that is on the ground 52 meters away. At what horizontal velocity must you throw the ball? [10.4m/s]
7. A ball is fired horizontally at 41 m/s and is traveling at 87m/s vertically when it hits the ground. From what height was it fired? [378.5m]
8. A plane has a takeoff speed of 88.3m/s and requires 1365m to reach that speed. Determine the acceleration of the plane and the time required to reach this speed. [$a=2.86\text{m/s}^2$ $t=30.9\text{s}$]
9. A tennis ball is thrown straight up with an initial velocity of 25.0m/s . It is caught at the same height above the ground as it was thrown. How high does the ball go? What was the total time it was in the air? [-31.25m , 5s]
10. You flip a coin straight up. What is the velocity at the top of its trajectory? If the coin reaches a high point of $.25\text{m}$ above where you released it, what was its initial velocity? How long did it spend in the air? [0m/s , 2.2m/s , $.44\text{s}$]