

## PROJECTILE MOTION WORKSHEET

1. A stone is thrown horizontally at 8.0 m/s from a cliff 80m high. How far from the base of the cliff will the stone strike the ground?
2. A toy car moves off the edge of a table that is 1.25m high. If the car lands 0.40m from the base of the table how long did it take to hit the floor and with what horizontal velocity was it moving?
3. A bald eagle in level flight at a height of 135m drops the fish it caught. If the eagle's speed is 25.0 m/s how far from the drop point will the fish land?
4. A pistol is fired horizontally toward a target 120m away but at the same height. The bullet's velocity is 200 m/s. How far below the target does the bullet hit and how long did it take to get there?
5. A bird, travelling at 50 m/s wants to hit a man 100m below with a dropping. How far in distance before flying directly over the man should the bird release it?
6. Barry Bonds hits a 125m (450') home run. Assuming that the ball left the bat at an angle of  $45^\circ$  from the horizontal, calculate how long the ball was in the air.
7. Will Clark throws a baseball with a horizontal component of velocity of 25 m/s. It takes 3.00s to come back to its original height. Calculate its horizontal range, its initial vertical component of velocity and its initial angle of projection.
8. A tennis ball thrown at a velocity of 25.0 m/s at  $53.1^\circ$  lands exactly 3.00s later on the top of a building. Calculate the horizontal distance it traveled and the height of the building.
9. \*\*A golfer can drive a ball with an initial speed of 30.0 m/s. If the tee and the green are separated by 80m, but on the same level, at what angle should the ball be driven (Hint: recall that  $2\cos(x)\sin(x)=\sin(2x)$ )?
10. How long will it take a shell fired from a cliff at an initial velocity of 800 m/s at an angle  $30^\circ$  below the horizontal to reach the ground 150m below?

Answers:

- 1) 32m
- 2)  $t=0.5\text{s}$ ,  $v_x=0.8\text{m/s}$
- 3) 130m
- 4)  $t=0.6\text{s}$ , 1.8m below target
- 5) bird should lay turd 225m before above man
- 6) 5s
- 7) 75m;  $v_{0y}=15\text{m/s}$ ;  $31^\circ$
- 8)  $R=45\text{m}$ ;  $H=15\text{m}$
- 9)  $31^\circ$
- 10) 0.37s