## PHYSICS 11

NAME:

## <u>Type I Projectiles</u>

- 1. A ball is pushed off of a 120.0 m building at a horizontal velocity of 16.0 m/s. Determine a. the time it takes to reach the ground.
  - b. the distance the ball lands away from the building at the ground level.
  - c. the vertical velocity if the ball just before it hits the ground.
  - d. the total velocity the ball reaches just before it hits the ground below the building.
- 2. A physics student drops a steel ball out of a car window. The car's speed is 40.0 m/s. The height of the window is 1.30 m. Calculate
  - a. the time it takes for the ball to hit the ground.
  - b. the horizontal distance traveled by the ball while falling.
  - c. the vertical velocity of the ball as it hits the ground.
  - d. the overall speed of the ball as it hits the ground.
- 3. A cliff diver is on a 30.0 m high cliff. With what velocity should they leave the cliff, (assume the person jumps out horizontally) in order to miss 8.0 m of rock coming from the cliff's base?

4. A mountain goat butts you off a 50.0 m high cliff with a horizontal velocity of 3.0 m/s. How far from the base will you strike the ground?

5. A stunt person jumps at 5.0 m/s horizontally, if she just lands on an airbag 24.2 m from the base of a building how high was the building?

6. A flying squirrel leaps off a building of height 30.0 m. If it left the building with a horizontal velocity of 1.0 m/s will it land safely on some garbage bags 5.0 m from the base of the building?

7. A physics student runs at 6.0 m/s horizontally off a 10.0 m high diving board. What will be her range when landing in the water below?

8. A rock is tossed off a bridge horizontally at 9.0 m/s and strikes the ground below 3.2 s later. How high is the bridge and what was the range of the throw?

9. A rifle is shot horizontally at 300 m/s from a height of 1.8 m. What is the maximum distance the bullet will travel before hitting the ground?

10. Water sprays horizontally out of a shower head which is 2.12 m above the ground. If the water hits the shower floor 0.85 m from the wall of the shower how fast was the water coming out the showerhead?

11. A supply plane flying at 250 m/s releases supplies 3900 m in front of survivors of a shipwreck. How high is the plane?

**Answers:** 1a) 4.95 s, b) 79.2 m, c) 48.5 m/s, d) 51.1 m/s, 2a) 0.52 s, b) 20.8 m, c) 40 m/s, d) 40.3 m/s, 3) 3.23m/s, 4) 9.58 m, 5) 115 m, 6) no, 2.47 m, 7) 8.57 m, 8) h=50.2m, r= 28.8 m, 9) 182 m, 10) 1.29 m/s, 11) 1.19×10<sup>3</sup> m