

# Projectile Motion Problem Set

2D Kinematics – HW#3

Name: \_\_\_\_\_

Date: \_\_\_\_\_ Period: \_\_\_\_\_

1. A tiger leaps horizontally from a 7.5 meter high rock with a speed of 3.2 m/s. How far from the base of the rock will she land?

2. A diver running 2.3 m/s dives out horizontally from the edge of a vertical cliff and 3.0 s later reaches the water below. (a) How high was the cliff and (b) how far from its base did the diver hit the water?

3. In the 1991 World Track and Field Championships in Tokyo, Mike Powell jumped 8.95 m, breaking by a full 5 cm the 23-year long-jump record set by Bob Beamon. Assume that Powell's speed on takeoff was 9.5 m/s (about equal to that of a sprinter) and that  $g = 9.80 \text{ m/s}^2$  in Tokyo. How much less was Powell's range than the maximum possible range for a particle launched at the same speed?

*These last two problems are more challenging and are thus worth double the amount of points.*

4. You buy a plastic dart gun, and being a clever physics student you decide to do a quick calculation to find its maximum horizontal range. You shoot the gun straight up, and it takes 4.0 s for the dart to land back at the barrel. What is the maximum horizontal range of your gun?

5. A shot-putter throws the shot (mass = 7.3 kg) with an initial speed of 14.4 m/s at a  $34.0^\circ$  angle to the horizontal. Calculate the horizontal distance traveled by the shot if it leaves the athlete's hand at a height of 2.10 m above the ground.