

AP Physics Lab #4— Projectile Motion

Name _____

Grade _____

In this lab you will derive two projectile formulas. The first is the range formula, which calculates the horizontal range of a projectile launched at an angle θ above the horizontal with an initial speed v_0 and returning to its initial height. The second formula is the maximum height formula for a projectile launched at an angle θ above the horizontal with an initial speed v_0 . In the space below show your derivations for the two formulas. Both formulas should be expressed solely in terms of v_0 , θ , and any constants. Be sure to simplify the formulas as much as possible.

After you have derived the formulas, use the webcams and the video analysis software to examine if the motion of a projectile follows your formulas. Calculate a percent difference between the maximum height recorded and the maximum height calculated using your formula. Calculate a percent difference between the horizontal range recorded and the range calculated using your formula.