Lab: Bus Jump Scene from Speed   AP Physics

Background
Two-dimensional motion can be analyzed by considering the horizontal and vertical components of motion independently. The infamous "bus jump scene" from the movie "Speed" is one example of such motion.

Objective
Practice using horizontal and vertical analysis of projectile motion.

Equipment
None

Procedure
Watch the bus jump scene and answer the questions below.

Questions
1. There is a gap in the freeway. Convert the gap's width to meters.

2. How fast is the bus traveling when it hits the gap? What is its velocity in m/s?

3. Keanu hopes that there is some "incline" that will assist them. Assume that the opposite side of the gap is 1 meter lower than the takeoff point. Also, the stunt drivers that launch this bus clearly have the assistance of a "takeoff ramp" from which the bus launches at an angle. Assume that the ramp is angled at 3.00° above the horizontal. Prove whether or not the bus will make it to the opposite side.

4. What is the *minimum* angle necessary for the bus to launch and make the opposite side of the gap?