

4. An antitank gun is located on the edge of a plateau that is 60m above the surrounding plain. During a training exercise, an enemy tank is placed stationary on the plain and at a horizontal distance of 2.2 km from the gun. The cannon is set to an angle of 30° above the horizontal.
- a. A practice round is shot, and the round reaches the apex its path of travel after 12.24 s. Calculate the muzzle velocity of the cannon.
- b. In the second training exercise, the cannon is locked into an angle of 10° above the horizontal. Calculate how far away from the cliff's edge the cannon will hit.
- c. And this time, the tank begins to accelerate away from the gun with an acceleration of 0.9 m/s^2 . Calculate how long should the crew wait before firing in order to hit the tank.
5. Prove that the range of a projectile launched from the ground can be given by $R = (v_0^2 \sin 2\theta)/g$.
(*hint: $\sin 2\theta = 2 \sin \theta \cos \theta$ -trig identity*)