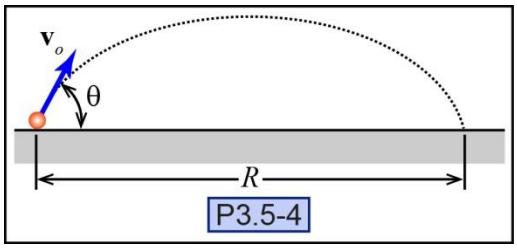
P3.5-4) Calculate the minimum speed (v_o) a projectile must have in order to hit a target R = 500 feet away. The target is located on the same horizontal plane as the starting location of the projectile.



Given:

Find:

Solution:

What is the projectile's initial velocity in terms of the x and y-coordinates?

$\mathbf{v}_0$ = _____ **i** + _____ **j**

At what angle will the range (R) be maximum?

θ = _____

Calculate the range.

What is the range of the projectile as a function of v_0, θ, and t?

R = _____

What is the time of flight as a function of v_0, and θ?

t = _____

Calculate the minimum speed.

Plug the time equation into the range equation and solve for v_o.

v_0 = _____