# Homework 4

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## Problem 1

A ball thrown at 20.0 m/s at angle $\theta$ below the horizontal from a cliff of height $H$ lands 69.0 m from the base 4.00 s later. Find $\theta$ and $H$.

## Problem 2

A ball is thrown at 14.0 m/s at 45° above the horizontal. Someone located 30.0 m away along line of the path starts to run just as the ball is thrown. How fast, and in which direction, must the person run to catch the ball at the level from which it was thrown?

## Problem 3

If a baseball player can throw a ball at 45° to a point 100 m away horizontally to the initial vertical level, how high could he throw it vertically upward?

## Problem 4

A motorcyclist plans to jump across a gorge width 32.0 m. He takes off on an 18.0° ramp. What minimum speed does he require if he lands at the initial level?

## Problem 5

A projectile fired from the ground has a velocity $\vec{v} = 24.0\hat{i} - 8.00\hat{j}$ m/s at a height of 9.10 m. Find: (a) the initial velocity; (b) the maximum height