

## Problem 1

A young Batman stands 30 ft. away from a hot air balloon that rests on the ground. He has tied a kite string to the bottom of the hot air balloon. As the balloon rises, young Batman notices that he is letting out string at a rate of 10ft./min at the exact time that he has let out 50 ft. of string. How fast is the balloon rising at this time? How fast is the angle between the ground and the string increasing at this time?

## Problem 2

Suppose that a cube's volume increases at a constant rate of  $2\frac{\text{cm}^3}{\text{min.}}$ . How fast are it's sides growing at the time the sides are 10cm.? How fast is the surface area increasing at this time?

## Problem 3

Suppose that a we are draining a conical tank whose height is 8 ft. and radius is 4 ft. We notice that that height of water is dropping at a rate of  $2\frac{\text{ft.}}{\text{min.}}$  at the time the height is 3ft. How much water (in  $\text{ft.}^3$ ) is coming out at this time?