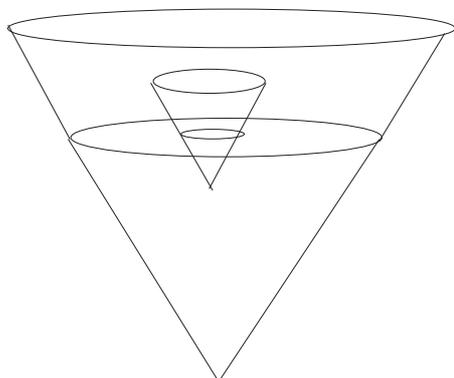


### Calculus 113 Homework 5

Due date: 10 December 2007 Monday

Please take your homework solutions to room SA144, Ali Adalı's office before 17:00.



**Q-1)**

The ratio of base radius to height for the small cone is  $\alpha_1$  and for the larger cone is  $\alpha_2$ . For simplicity assume  $0 < \alpha_1 \leq \alpha_2$ .

At a given time  $t$ , the tip of the smaller cone is  $d(t)$  distance away from the tip of the larger cone, and it is  $h(t)$  distance below the water level. Meanwhile the flat base of the smaller cone is  $\ell(t)$  distance away from the water surface. The tip of the smaller cone is moving at a constant rate of  $\beta$  units per second. If at time  $t_0$  we observe that  $h(t_0) = h_0$  and  $d(t_0) = d_0$ , then find  $h'(t_0)$  and  $\ell'(t_0)$ .