

Max/min problems, MA 118 Summer 2009

1. The height of a ball thrown upward at an initial speed of 64 ft/sec from a platform 50 ft above the ground is given by the function  $s(t) = -16t^2 + 64t + 50$ , where  $s(t)$  is measured in feet above the ground.

(a) Determine the time it takes the ball to attain its maximum height.

(b) Determine the maximum height the ball attains.

(c) Determine the time it takes the ball to hit the ground.

2. A mining company has determined that the cost  $C$  in dollars per ton of mining a mineral is given by  $c(x) = 0.2x^2 - 2x + 12$ , where  $x$  is the number of tons of the mineral that should be mined to minimize the cost. What is the minimum cost?

3. The owners of a travel agency have determined that they can sell all 160 tickets for a tour if they charge \$8 (their cost) for each ticket. For each \$0.25 increase in the price of a ticket, they estimate they will sell one ticket less. A business manager determines that their cost function is  $C(x) = 8x$  and that the customer's price per ticket is

$$p(x) = 8 + 0.25(160 - x) \Rightarrow p(x) = 48 - 0.25x$$

where  $x$  represents the number of tickets sold. Determine the maximum profit and the cost per ticket that yields the maximum profit.