

Week 2  
MATH 34A  
TA: Jerry Luo

28. (a) A highway patrolman traveling at the speed limit is passed by a car going 10 mph faster than the speed limit. After one minute, the patrolman speeds up to 85 mph. How long after speeding up until the patrolman catches up with the speeding car. The speed limit is 55 mph.

- (b) Same question, but this time the patrolman speeds up to a speed of  $v$  mph ( $v > 65$ ).

44. In a 6 acre apple orchard, it is decided to plant 20 or more trees per acre. If 20 trees are planted per acre then each mature tree will yield 400 apples per year. For each additional tree planted per acre, the number of apples produced by each tree decreases by 12 per year. Express the total number of apples  $A$  produced per year in terms of the number  $n$  of trees per acre.

51. An airline sells all the tickets for a certain route at the same price. If it charges 200 dollars per ticket it sells 10,000 tickets. For every 15 dollars the ticket price is reduced, an extra thousand tickets are sold. Thus if the tickets are sold for 185 dollars each then 11,000 tickets sell. It costs the airline 100 dollars to fly a person.

(a) Express the total profit  $P$  in terms of the number  $n$  of tickets sold.

(b) Express the total profit  $P$  in terms of the price  $p$  of one ticket.

53. An aquarium with a square base has no top. There is a metal frame. Glass costs 6 dollars/m<sup>2</sup> and the frame costs 7 dollars/m. The volume is to be 20m<sup>3</sup>. Express the total cost  $C$  in terms of the height  $h$  in meters. (Hint: work out the cost of the glass and frame separately.)