(1) A farmer has 200 yards of fence with which to construct three sides of a rectangular pen; an existing long, straight wall will form the fourth side. What dimensions will maximize the area of the pen?

(2) At noon the Love Boat is 50 mi due north of the good ship Lollipop and is steaming south at 16 mi/h. The good ship Lollipop is headed west at 12 mi/h. At what time are they closest together, and what is the minimal distance between them?

(3) The Leopard Automotive Co. estimates that they can sell 5000 cars a month at $40,000 each, and that they can sell 500 more cars per month for each $1000 decrease in price.

(a) What price per car will bring the largest gross income?

(b) If each car costs $16,000 to make, what price will bring the largest total profit?