OPTIMIZATION PROBLEMS

(1) Find the area of the rectangle inscribed between the x-axis and the parabola described by the equation $y = 12 - x^2$ with the greatest area.
Demonstration

(2) The residents of an island 3 km from the shore want to get power from a power station that is 4 km down the shore line. They must lay wire under water to some point on the shore, then they can run wire from that point along the shore to the power station. The cost to lay wire on land is 1 dollar per km while the cost to lay wire under water is 2 dollars per km. To what point on the shore should the residents lay the wire under water?

Demonstration