Applied Optimization

Q1. If 1200 m^2 of material is used to construct a rectangular box with a square base and an open top, then the largest possible volume of the box is:

(Ans. 4000 m^3)

Q2. A rectangular poster is to have an area of 1600 cm^2 with 4 cm margins at the bottom and sides and 6 cm margin at the top. What are the dimensions of the <u>poster</u> with the largest possible <u>printed</u> area?

(Ans. width = 16√5 cm and height = 20√5 cm)

Q3. If (a, b) is a point on the ellipse $4x^2 + y^2 = 4$ which is farthest away from the point (1, 0), then b^2 =

(Ans. $\frac{32}{9}$)

Q4. The sum of two positive numbers is 5. If the product P of the square of the first number and the cube of the second number is maximized, then P =

(Ans. 108)

Q5. Determine the area of the largest rectangle that can be inscribed in a circle of radius 4.

(Ans. 32)

Q6. Determine the points on $y = x^2 + 1$ that are closest to (0, 2).
(Ans. $\left(-\frac{1}{\sqrt{2}}, \frac{3}{2}\right), \left(\frac{1}{\sqrt{2}}, \frac{3}{2}\right)$)