

COLLEGE OF SCIENCE AND TECHNOLOGY
SCHOOL OF SCIENCES
DEPARTMENT OF MATHEMATICS

Assignment I
Advanced Partial Differential equations
Doctoral Program in Mathematics

By
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Question 1:

A product can be made in three sizes, large, medium, and small, which yield a net unit profit of \$12, 10, and 9, respectively. The company has three centers where this product can be manufactured and these centers have a capacity of turning out 550, 750, and 275 units of the product per day, respectively, regardless of the size or combination of sizes involved.

Manufacturing this product requires cooling water and each unit of large, medium, and small sizes produced require 21, 17, and 9 gallons of water, respectively. The centers 1, 2, and 3 have 10,000, 7000, and 4200 gallons of cooling water available per day, respectively. Market studies indicate that there is a market for 700, 900, and 340 units of the large, medium, and small sizes, respectively, per day. By company policy, the fraction (scheduled production)/(center's capacity) must be the same at all the centers. How many units of each of the sizes should be produced at the various centers in order to maximize the profit?