AP Calculus Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Pd.\_\_

Optimization Day 3 Application of Derivatives

1. A box with a square base and open top must have a volume of 32,000  𝑐𝑚3. Find the dimensions of the box that minimize the amount of material used. **Answer:** 40 40 20

2. If 1200  of material is available to make a box with a square base and an open top, find the largest possible volume of the box. **Answer:** 20 10

3. A rectangular storage container with an open top is to have a volume of 10. The length of its base is twice the width. Material for the base costs $10 per square meter. Material for the sides cost $6 per square meter. Find the cost of materials for the cheapest such container. **Answer:** $163.54

4. Find the dimensions of the rectangle of largest area that can be inscribed in a circle of radius r. **Answer: **

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5. Find the point on the parabola that is closest to the point (0, 3). **Answer: **

6. A farmer has 3600 ft of fencing and wants to fence off a rectangular field that borders a straight river. He needs no fencing along the river. What are the dimensions of the field that has the largest area? **Answer:** 900 1800 900

7. A rectangular storage container with open top is to have a volume of 800 . The length of its base is three times the width. Material for the base costs $25 per square meter. Material for the sides costs $15 per square meter. Find the cost of materials for the cheapest such container. **Answer:** $8033.20