

# Math 199 CD2: Optimization Using Derivative

October 19, 2021

1. Find the point(s) on the parabola  $2x = y^2$  closest to the point  $(1, 0)$ .
2. A farmer wishes to fence in a rectangular field of 10,000 square ft . The north-south fences will cost 1.50 dollars per foot, while the east-west fences will cost 6.00 dollars per foot. Find the dimensions of the field that will minimize the cost.
3. A rectangular bin, open at the top, is required to contain 128 cubic meters. If the bottom is to be a square, at a cost of 2 dollars per square meter, while the sides cost 0.50 dollars per square meter, what dimensions will minimize the cost?

4. Find the point(s) on the graph of  $3x^2 + 10xy + 3y^2 = 9$  closest to the origin.
5. Among all pairs of nonnegative numbers that add up to 5, find the pair that maximizes the product of the square of the first number and the cube of the second number
6. The sum of the squares of two nonnegative numbers is to be 4. How should they be chosen so that the product of their cubes is a maximum?