Applied Optimization:

A company manufactures two types of bicycles: mountain bikes and road bikes. The price function for mountain bikes is $p = 22 - 3x$ and for road bikes is $q = 18 - 2y$, where prices are in hundreds of dollars.

The profit function is given by:
$P(x, y) = -3x^2 - 2y^2 + 3xy + 3x + 5y - 6$

Find out how many of each type of bicycle should be produced and the prices that should be charged to maximize profit.