Problem. A farmer has 76 feet of fencing and wants to build a rectangle pen. what should the deminsions of the pen be if he wants the greatest area possible?

Solution. Denote by a, b two sides of recatangle we want to maximize ab undere restriction $2a + 2b = 76$, which is equivalent to $a + b = 38$, hence $a = 38 - b$. Now our task is to maximize $b(38 - b)$, but it is quadratic function with maximum at the point $b = 19$. To sum it over, the maximum of the area attains when $a = b = 19$ (when our rectangle is square).

Answer. Sides of rectangle $a = b = 19$, the biggest possible area is $19^2 = 361$.