Question #8284 You are designing a rectangular poster to contain 48 in2 of printing with a 3-in. margin at the top and bottom and a 1-in. margin at each side. What overall dimensions will minimize the amount of paper used?

Solution. Suppose that a and b are the dimensions of printing area, then $ab = 48$ and we are to minimize $ab + 2(b + 6) \cdot 1 + 2a \cdot 3$, or what is equivalent $b + 3a \to \min$ under the restriction $ab = 48$, when the product is of two numbers is constant the minimum is achieved, when they are equal, hence $b = 3a$, thus $a = 4$ and $b = 12$.

Answer. 4 and 12.