Solution to Homework 3

Task. Use calculus to find the value x for which the following function attains its minimum: $x^2 + 2x + 1$. What is the value of this minimum?

Solution. According to calculus, minimum and maximum of a function are attained at the points at which its derivative is equal to 0. Here,

$$(x^2 + 2x + 1)' = 2x + 2,$$

so the location of the minimum can be determined by the equation $2x + 2 = 0$, so $2x = -2$, and $x = -1$.

For this x, the function takes the value

$$x^2 + 2x + 1 = (-1)^2 + 2 \cdot (-1) + 1 = 1 - 2 + 1 = 0.$$