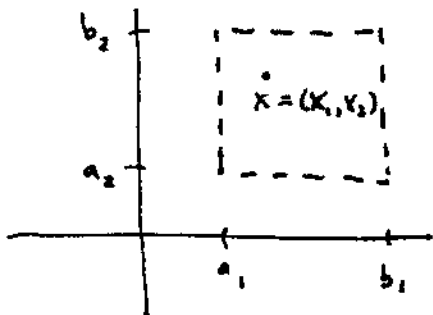


The statement that $x = (x_1, x_2)$ is in the rectangle $(a_1, b_1) \times (a_2, b_2)$ formally means that

$$x_1 \in (a_1, b_1) \quad \text{and} \quad x_2 \in (a_2, b_2)$$

This is clear from the picture:



To show that $(a_1, b_1) \times (a_2, b_2)$ is open we must find an open ball $U_r(x)$ that is contained in the rectangle. The question is: How small must r be so that $U_r(x)$ is contained in the rectangle?

Certainly we don't want the ball $U_r(x)$ to hit the top of the rectangle. So we want

$$r < b_2 - x_2$$

Of course we also don't want it to hit the bottom or the sides, so we also want