Topology

Definition. *Let (X, τ_1) and (Y, τ_2) be two topological spaces. The collection $\mathcal{B} = \tau_1 \times \tau_2 = \{u \times v : u \in \tau_1, v \in \tau_2\}$ is a basis for a topology on $X \times Y$. The topology generated by $\mathcal{B}$ is called the* ***product topology*** *on $X \times Y$.*

Theorem. *Let (X, τ) and (Y, σ) be two topological spaces. Let $\mathcal{B}$ be a basis for τ and $\mathcal{C}$ be a basis for σ. Then the collection $\mathcal{D} = \{U \times V : U \in \mathcal{B}, V \in \mathcal{C}\}$ is a basis for the product topology on $X \times Y$.*

Result. *The product topology on ${}_a t_h b_b R$*
$cdot_a t_h b_b R$ coincides with the usual topology on ${}_a t_h b_b R^2$
