

Problem 3

$(\Omega_1, \mathcal{F}_1)$ and $(\Omega_2, \mathcal{F}_2)$ are measurable spaces, with $\Omega_1 = \{1, 2\}$ and $\Omega_2 = \{3, 4\}$.

$\mathcal{F}_1 = \mathcal{P}(\Omega_1)$ and $\mathcal{F}_2 = \mathcal{P}(\Omega_2)$.

List all measurable rectangles of $\Omega_1 \times \Omega_2$ and describe the σ -algebra $\mathcal{F}_1 \times \mathcal{F}_2$.

Show that $(\Omega_1, \mathcal{F}_1, \eta)$ and $(\Omega_2, \mathcal{F}_2, \eta)$ are σ -finite measure spaces, where η is the counting measure on \mathcal{F}_1 and \mathcal{F}_2 .