Exercise Number: 3.6.2

Proposition. Consider Lebesgue measure on $[0,1]$ with standard notation. Let $A = (1/2, 3/4)$ and $B = (0, 2/3)$. Then A and B are independent events.

Proof. The proposition merely follows by definition. Consider that

$$\mathbb{P}(A \cap B) = (1/2, 3/4) \cap (0, 2/3) = 1/6$$

and

$$\mathbb{P}(A)\mathbb{P}(B) = 2/3 * 1/2 = 1/6.$$

□