

# Asset Pricing: Assignment 1

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## 1 Problem 1.1: Fair Games

State whether each of the following statements is true or false. Provide a proof if the statement is true or a counterexample if the statement is false.

### 1.1 Part (a):

*If  $X$  is a fair game with respect to  $Y$ , and  $Y$  is a fair game with respect to  $X$ , then  $X$  and  $Y$  are independent.*

The above statement is false. For a counter example consider two independent random variables  $X$  and  $Z$  with probability mass function  $p_X$  and  $p_Z$ , give as follows

$$p_X(u) = p_Z(u) = \begin{cases} 0.5 & \text{for } u \in \{-1, 1\} \\ 0 & \text{o/w} \end{cases}$$