

True/False - No explanation needed. (2pts)

1. If two events A and B intersects ($A \cap B \neq \emptyset$), then they can't be independent. True/False
2. To show that two random variables are independent, it is enough to find a pair of two events $E, F \subset \mathbb{R}$ such that $P(X^{-1}(E) \cap X^{-1}(F)) = P(X^{-1}(E))P(X^{-1}(F))$. True/False

Problems - Need justification. No justification means **zero!**

1. Let E and F be the events that a family of 3 children has children of both sexes and has at most one boy, respectively. Are E and F independent? (5pts)

2. Suppose that a 6-sided fair die is rolled twice. Compute the probability mass function of the random variable

$X =$ the difference of the two rolls.

(5pts)