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

1. If two events A and B are disjoint, then they are independent. True/False

2. If the range of a random variable X is a set $T \subset \mathbb{R}$, then we should have $\sum_{t \in T} P(X^{-1}(t)) = 1$. True/False

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

1. Two dies were rolled. Are the events that the first die rolled is a 2 and that the two rolls are the same independent? (5pts)

2. Flip a fair coin 4 times, and let X denote **the product of the number of heads and the number of tails**. Find the probability mass function for X. (5pts)