

Quiz 6 Solution

True/False - No explanation needed. (For each: 1 point if correct, 0 points if not answered, -1 points if incorrect)

1. If the probability that an event A occurs is 0 or 1, then for any event B , A and B are independent. True/False

True. If $P(A) = 0$, then $P(A \cap B) = P(A)P(B) = 0$ If $P(A) = 1$ then $P(A \cap B) = P(A)P(B) = P(B)$.

2. If two dice are rolled, the probability that the first die is a 5 and the probability the two dice roll the same number are independent. True/False

True $P(A)P(B) = P(A \cap B) = 1/36$

Problems - Needs justification.

1. Find the probability mass function f of $X =$ (number of 7's in a five card hand) drawn from a standard 52 card deck. You can leave your answer as fractions with binomials. (10 points)

There can be 0 to 4 7's in the hand. For each value we count the number of ways to get that number of 7's and that number of non 7's.

$$f(0) = \frac{\binom{48}{5}}{\binom{52}{5}}$$

$$f(1) = \frac{4\binom{48}{4}}{\binom{52}{5}}$$

$$f(2) = \frac{\binom{4}{2}\binom{48}{3}}{\binom{52}{5}}$$

$$f(3) = \frac{\binom{4}{3}\binom{48}{2}}{\binom{52}{5}}$$

$$f(4) = \frac{\binom{4}{4}\binom{48}{1}}{\binom{52}{5}}$$