1 Problems

Example 1.1. (PSI 1.2.7) In a state lottery, four digits are drawn at random one at a time with replacement from 0 to 9. Suppose that you win if any permutation of your selected integers is drawn. Give the probability of winning if you select

1. 6, 7, 8, 9.
   - (A) $\frac{24}{10^4}$
   - (B) $\frac{24}{10^4}$
   - (C) $\frac{4}{10^4}$
   - (D) $\frac{12}{10^4}$
   - (E) $\frac{4^4}{10^4}$

2. 6, 7, 8, 8.
   - (A) $\frac{24}{10^4}$
   - (B) $\frac{24}{10^4}$
   - (C) $\frac{4}{10^4}$
   - (D) $\frac{12}{10^4}$
   - (E) $\frac{4^4}{10^4}$

3. 7, 7, 8, 8.
   - (A) $\frac{6}{10^4}$
   - (B) $\frac{6}{10^4}$
   - (C) $\frac{4}{10^4}$
   - (D) $\frac{12}{10^4}$
   - (E) $\frac{24}{10^4}$

4. 7, 8, 8, 8.
   - (A) $\frac{4}{10^4}$
   - (B) $\frac{24}{10^4}$
   - (C) $\frac{4}{10^4}$
   - (D) $\frac{12}{10^4}$
   - (E) $\frac{4^4}{10^4}$

Example 1.2. Random Variable Example Two dice are thrown: $D_1$ & $D_2$. Let random variable $X$ be the sum of numbers facing up. Find $E(X)$. 
Example 1.3. Monica throws two dice in a backgammon game. You know that the sum of two dice is 10. What is the probability that one of the dice is 5?

(A) $\frac{1}{6}$  (B) $\frac{1}{5}$  (C) $\frac{1}{4}$  (D) $\frac{1}{3}$  (E) $\frac{1}{2}$

Example 1.4. On average, how many rolls we need to throw a fair dice to get all 6 outcomes?

(A) 6  (B) 36  (C) 12  (D) 14.7  (E) $\frac{144}{7}$

Example 1.5. Old Quiz Problem Let a random experiment be the casting of a pair of fair six-sided dice and let $X$ equal the minimum of the two outcomes.

1. Compute the mean of $X$, $E[X]$.

Example 1.6. PSI-2.2.5 Let the random variable $X$ be the number of days that a certain patient needs to be in the hospital. Suppose $X$ has the pmf

$$f(x) = \frac{5-x}{10}, \quad x = 1, 2, 3, 4$$

If the patient is to receive $200 from an insurance company for each of the first two days in the hospital and $100 for each day after the first two days, what is the expected payment for the hospitalization? (A) 260  (B) 300  (C) 310  (D) 350  (E) 360