DATA 1010
In-class exercises
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Problem 1

Devise a principle of inclusion-exclusion for *three* sets. In other words, write $\mathbb{P}(A \cup B \cup C)$ in terms of probabilities of A, B, C, and their intersections.

Problem 2

Find the probability of getting two pairs (like 3, 4, 5, 4, 3) with a roll of five dice. Express your answer as an unreduced fraction.

Problem 3

A problem on a test requires students to match molecule diagrams to their appropriate labels. Suppose there are three labels and three diagrams and that student guesses a matching uniformly at random. Let X denote the number of diagrams the student correctly labels. What is the probability mass function of the distribution of X?

Problem 4

Consider a random variable X whose distribution is the one shown in the figure below. Identify each of the following statements as true or false.

(a) $\mathbb{P}(-1 < X < 1)$ is greater than $\frac{3}{5}$

(b) $\mathbb{P}(X \geq 2) = 0$

(c) $\mathbb{P}\left(-\frac{1}{2} < X < 0\right)$ is greater than $\frac{1}{100}$

(d) $\mathbb{P}(100X < 1)$ is greater than $\frac{1}{2}$