The topics for Test 1.

1. Basic properties of probability.
   \[ P(A) = 1 - P(A'). \]
   \[ P(A \cup B) = P(A) + P(B) - P(A \cap B). \]
   \[ P(A \cup B \cup C) = P(A) + P(B) + P(C) - P(A \cap B) - P(A \cap C) - P(B \cap C) + P(A \cap B \cap C). \]
2. Venn diagrams.
3. Equally likely events
   \[ P(A) = \frac{\#(\text{outcomes in } A)}{\#(\text{outcomes in } S)}. \]
4. Product rule
   \[ N = n_1 n_2. \]
5. Permutations of size \(k\) of \(n\) objects.
   \[ P_{k,n} = \frac{n!}{(n-k)!}. \]
6. Combinations of size \(k\) of \(n\) objects.
   \[ \binom{n}{k} = \frac{n!}{k!(n-k)!}. \]
7. Tree diagrams.
8. Conditional probability
   \[ P(A|B) = \frac{P(A \cap B)}{P(B)}, \]
   \[ P(A \cap B) = P(B)P(A|B). \]