

Unit 4 In Class Assignment

September 21, 2025

1. The Sum rule is applicable when you have two sets of possible actions A and B . Where $A \subset S$, $B \subset S$, but $A \cap B = \emptyset$. The possible set of choices is $|A| + |B|$
2. (a) $4(5) = 20$
 (b) $4 + 5 = 9$
 (c) $\binom{4}{2}(5) = 30$
3. The product rule is applicable when you have two sets with the same set of restrictions as before, but you can perform one action from each set simultaneously.
4. $41 \cdot 40 \cdot 39 = 63,960$
5. (a) 62^7
 (b) 78^8
 (c) Worst case: $0.5(78^8)$ seconds, Best case: 0.5 seconds, Average case: $0.25(78^8)$ seconds
 (d) $62^8 - 52^8 - 10^8$
6. (a) $30 + 40 + 50 = 120$
 (b) $30 \cdot 40 \cdot 50 = 60,000$
 (c) $\binom{50}{5} = 2,118,760$
 (d) $\binom{120}{5} = 190,578,024$
7. (a) $\lfloor \frac{987}{8} \rfloor - \lfloor \frac{99}{8} \rfloor = 111$
 (b) $\lfloor \frac{987}{2} \rfloor - \lfloor \frac{99}{2} \rfloor = 444$
 (c) 648
8. $\lceil 38/7 \rceil = 6$
9. A permutation is an ordered arrangement of distinct objects. The number of permutations of k elements chosen from n is $P(n, k) = \frac{n!}{(n - k)!}$.
10. (a) $P(5, 3) = 60$
 (b) $\binom{5}{4} \binom{2}{2} \binom{3}{3} = 5$
 (c) $5! \cdot 2! = 240$