Test 10: Name Theepakorn Phongsoot ID 6501352

1. How many subsets of {a, b, c, d, e, f, g} contains a or g?

   Total subsets of {a, b, c, d, e, f, g} = $2^7 = 128$

   Number of subsets of {b, c, d, e, f} = $2^5 = 32$

   Number of subsets containing a or g = $128 - 32 = 96$

2. How many subsets of {a, b, c, d, e, f, g} contains at most 3 elements?

$\binom{7}{0} + \binom{7}{1} + \binom{7}{2} + \binom{7}{3} = 1 + 7 + 21 + 35 = 64$

3. A dinner allows you to select from five appetizers, three salads, four entrees, and three beverages. How many different dinners are there if you may have an appetizer or a salad but not both?

Answer = With appetizer + With salad $= (5 \cdot 4 \cdot 3) + (3 \cdot 4 \cdot 3)$

$= 60 + 36 = 96$

4. 10 students. How many ways to form a party planning committee? Each student can be in or out of the committee.

$2^{10} = 1024$

5. How many permutations of letters A B C D E F G H contain a substring ABC.

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$5! \cdot 6 = 6! = 720$

6. Suppose that there are eight runners in a race. The winner receives a gold medal, the second-place finisher receives a silver medal, and the third-place finisher receives a bronze medal. How many different ways are there to award these medals, if all possible outcomes of the race can occur?

$P_{8,3} = \frac{8!}{5!} = 8 \times 7 \times 6 = 336$