MATH 112 Discrete Mathematics.
Suggested Exercise set II

Problem 1. In how many ways can 9 identical horses on a carousel be painted so that one is brown, three are white, and five are black (arrangements are considered the same if one can be obtained from the other by rotation).

Problem 2. For a convex polygon with 100 sides:
a. determine the number of the diagonals;
b. if no three diagonals intersect at the same point determine the number of intersection points of the diagonals.

Problem 3.
a. Find the coefficient of $x^2 y^7 z^2 w^8$ in the expansion of $(v + x - 3y - 2z + 5w + 3)^{119}$.
b. How many terms does the expansion of $(v + x - 3y - 2z + 5w + 3)^{119}$ have?

Problem 4. In how many ways can we distribute 16 identical marbles into four distinct containers if
a. all containers have even number of marbles?
b. the number of marbles in the last container is at most five and odd?

Problem 5. Determine the number of integer solutions of $x_1 + x_2 + x_3 = 32$ where
a) x_1, $x_2 > 5$ and $x_3 \geq 8$;
b) x_1, $x_2 > -3$ and $x_3 \geq 6$;
c) x_1, $x_2 > 0$ and $0 \leq x_3 \leq 25$.

Problem 6. In how many ways can a positive integer n be written as a sum of r positive integer summands if the order of the summand is relevant?

Problem 7. How many distributions of ten different books are possible if Ahmet is to receive 5 books, Semra is to receive 3 books, and Ersan is to receive 2 books?

Problem 8. Fifteen balloons are to be distributed to four children. How many distributions are there if
a. all balloons are different?
b. there are nine red identical balloons and six different non red balloons?
c. there are nine red identical balloons, six identical blue balloons and every child must get at least one red balloon?