

Hints for sample problems.

(1) (a) The number of ways to divide 5 apples among three people equals to the number of non negative solutions of $x_1 + x_2 + x_3 = 5$ which is $\binom{5+3-1}{3-1} = \binom{7}{2}$

Likewise there are $\binom{10}{2}$ ways to divide 8 oranges among 3 people. So the answer is

$$\binom{7}{2} \times \binom{10}{2}$$

(b) If the first person gets 3 oranges then we need to distribute 5 oranges among two other people. So the answer is

$$\binom{7}{2} \times \binom{6}{1}$$

(c) There are 3 ways to divide apples (first person can receive 0, 1 or 2 apples) so the answer is

$$3 \times \binom{10}{2}$$

(2) There are 4 ways to place 1, 4 ways to place 2 and $6!$ ways to place remaining numbers. So the answer is $4 \times 4 \times 6!$