You do not have to simplify numerical answers, but you must present your final answer using only numbers and the operations of addition, subtraction, multiplication, division, powers and factorials.

   Write all answers in the space provided below each problem.

1. A contest has 17 contestants with 6 prizes to be awarded. How many possible ways could this be done under each of the following conditions?

   (a) The 6 prizes are identical and no contestant gets more than 1.

Ans: All that matters is which 6 contestants get a prize: $C(17,6) = \dfrac{17!}{6!(17-6)!}$

   (b) The 6 prizes are identical and any contestant can get any number of them.

Ans: 6 selections, with repetition, from a set of size 17: $C(6+17-1,6) = \dfrac{22!}{6!(22-6)!}$

   (c) The 6 prizes are all different and no contestant gets more than 1.

Ans: This is a permutation: after choosing the 6 contestants, we must assign the prizes to them:

$P(17,6) = \dfrac{17!}{(17-6)!}.$

2. (a) How many ways can I distribute 16 identical pieces of candy to 4 children?

Ans: Choose 16 times (with repetition of course) from the set of 4 children:

$C(16+4-1,16) = \dfrac{19!}{16!\,3!}$

   (b) How many ways can I do this if I require each child to receive at least 2 of them?

Ans: After giving each 2 pieces, choose 8 times with repetiton from the set of 4 children:

$C(8+4-1,8) = \dfrac{11!}{8!\,3!}$