Directions: Answer the problem given below. You *do not* need to simplify: your answers may include products, division, sums, differences, exponents, factorials, and binomial coefficients.

1. You wish to print 20 copies of a flyer, and at the photocopier you find you have access to four different colors of paper: white, green, yellow, and salmon. You may assume that you have at least 20 sheets in each color.

a. In how many different ways can you print your flyers?

$$= \# \text{ of } 20\text{-combinations of the 4 colors}$$

$$= \binom{20+4-1}{20} = \boxed{\binom{23}{20}}.$$

b. In how many different ways can you print your flyers if you decide not to make any white copies?

$$= \# \, 20\text{-combinations of the 3 remaining colors}$$

$$= \binom{20+3-1}{20} = \boxed{\binom{22}{20}}.$$

c. In how many different ways can you print your flyers if you decide that you want at least 5 salmon copies?

$$= \# \, 15\text{-combinations of the 4 colors}$$

$$= \binom{15+4-1}{15} = \boxed{\binom{18}{15}}.$$