1. Suppose there are 8 people in a room.

   (a) How many 3 person subsets are there? (Give a whole number as your answer)
   
   Answer: There are
   \[ \binom{8}{3} = \frac{8!}{3!5!} = \frac{8 \cdot 7 \cdot 6}{3 \cdot 2 \cdot 1} = 8 \cdot 7 = 56 \]

   3 person subsets.

   (b) In how many ways can you choose 10 of these subsets. (You can give an expression involving factorials as your answer, don’t compute a whole number!)
   
   Answer:
   \[ \binom{56}{10} = \frac{56!}{10!46!} \]

2. With respect to sets and subsets, what does the binomial coefficient \( \binom{n}{k} \) represent?

   Answer: The binomial coefficient \( \binom{n}{k} \) is the number of \( k \)-element subsets that can be formed from an \( n \)-element set.

3. What is Pascal’s identity and what are its boundary conditions?

   Answer: Pascal’s identity is
   \[ \binom{n}{k} = \binom{n-1}{k} + \binom{n-1}{k-1} \]

   and the boundary conditions are
   \[ \binom{n}{0} = \binom{n}{n} = 1 \]