1. How many different varieties of pizza can be made if you have the following options: small, medium, or large; thin or deep dish; and 10 toppings.

$$\binom{3}{1}\binom{2}{1}\left(\sum_{n=0}^{10}\binom{10}{n}\right)$$

2. Three students and six faculty make up a committee to discuss a new policy.
   - How many ways can the nine committee members be lined up? $9!$
   - How many linesups are possible is only student or faculty $3!6!$ labels are considered?

3. Consider a game of pocker with a standard, fair 52 deck of cards. Find the probability of the following hands:
   - Four of a kind (four of the same face value and one different).

$$\frac{\binom{13}{1}\binom{4}{4}\binom{12}{1}\binom{4}{1}}{\binom{52}{5}}$$

   - Full house (a pair and a triple).

$$\frac{\binom{13}{1}\binom{4}{2}\binom{12}{1}\binom{4}{3}}{\binom{52}{5}}$$

   - Three of a kind (three of the same face value and two different values).

$$\frac{\binom{13}{1}\binom{4}{3}\binom{12}{2}\binom{4}{1}\binom{4}{1}}{\binom{52}{5}}$$