

1. How many different 5-digit zip codes are possible if
 - a) the zip code begins with a 4 and digits can be repeated?
 - b) the zip code is divisible by 2 and digits cannot be repeated?
2. There are 40 numbers on a combination lock, and 3 numbers in the locker combination. How many possible locker combinations are there?
3. There are 4 whippets, 5 golden retrievers, 2 Great Pyrenees, and 6 English terriers in a dog show. If dogs of the same breed are considered identical, in how many distinct ways can these dogs line up in front of the judge?
4. Eleven desks are available for eight students. How many ways can they choose their seats?
5. Four girls and 3 boys are to be seated side-by-side at a long table. In how many ways can they be seated, if they must sit girl-boy-girl-boy-girl-boy-girl?

The next two problems involve mutually exclusive events, which have no common elements.

6. How many positive even integers less than 1000 can be formed using 2, 3, 4, 5, and 6, if digits may be repeated?
7. In how many ways can six students line up in alphabetical or reverse alphabetical order?
8. Simplify: $\frac{(n-4)!}{n!}$