

Quiz 4

Every answer must be fully justified. Show your work!!! Your answers may include factorials if appropriate, but do not leave expressions like ${}_{200}P_{50}$ or ${}_{200}C_{50}$.

1. For this problem assume that in Illinois license plates have to be made up of 2 letters followed by 4 digits (for example, HF 2335 or AA 0679).

- (a) How many different Illinois license plates are possible?

$$26 \cdot 26 \cdot 10 \cdot 10 \cdot 10 \cdot 10 = 6,760,000$$

- (b) How many different Illinois license plates are possible that begin with A and have no zeroes in them (for example, AX 3356 or AA 9872)?

$$1 \cdot 26 \cdot 9 \cdot 9 \cdot 9 \cdot 9 = 170,586$$

- (c) How many different Illinois license plates are possible that have all of the digits the same (for example, CD 7777 or EE 0000)?

$$26 \cdot 26 \cdot 10 \cdot 1 \cdot 1 \cdot 1 = 6,760$$

2. Suppose that you are asked to rank your top 5 movies in order out of a list of 20 movies. How many possible ways are there to do this?

$${}_{20}P_5 = \frac{20!}{15!} = 1,860,480$$

3. Suppose that out of a group of 30 people waiting to get backstage, a group of 4 people are chosen to go back and meet a rock band.

- (a) How many different possible groups are there?

$${}_{30}C_4 = \frac{30!}{26!4!} = 27,405$$

- (b) If Jane is one of the people in line, how many different possible groups are there that include Jane?

$${}_{29}C_3 = \frac{29!}{26!3!} = 3,654$$