

W.W. $\frac{30}{30}$ I'm probably going to ace this Timothy H.
Please leave your answer in terms of C, P, fractions and/or factorials. No need to simplify your expressions.

1. In a standard deck of 52 cards, there are 26 red and 26 black cards. In this problem you are drawing cards WITHOUT REPLACEMENT

- a) What is the **probability** of drawing a black, black and red card in that order?

$$\begin{array}{c} \text{black black red} \\ \underline{26 \cdot 25 \cdot 26} \\ 52 \cdot 51 \cdot 50 \\ \text{1st 2nd 3rd} \end{array}$$

- b) What is the **probability** of picking 3 cards and having exactly 2 of them be black?

$$\begin{array}{c} \text{2 black 1 red} \\ \underline{(26) \cdot (26)} \\ (52) \\ \text{3 cards} \end{array}$$

2. Ms. Gleason owns 9 different horses. **How many ways** could she arrange them.....

a) in a straight line? $9!$

b) in a circle? $8!$

- c) in a straight line if "Sunnyvale Slew" and "Mrs. Edwina" have to be at either end?

$$\begin{array}{c} 2 \cdot 7! \\ S \overset{?}{\cdots} E \quad E \overset{?}{\cdots} S \end{array}$$

- d) in a straight line but "Sunnyvale Slew" "Mrs. Edwina" and "Pascal" must be next to each other?

$6 \cdot 7!$

$6 \cdot 7!$

3. Monte the Moocher has a deck of **13 cards**, all of the hearts from A, 2, 3 J, Q, K.
He deals you a three-card hand. Remember that aces are not face cards.

- a) **How many** different 3-card hands have no face cards? $\binom{10}{3}$

- b) **How many** different 3-card hands have at least two face cards? $\underbrace{\binom{3}{2} \cdot 10}_{2} + \underbrace{\binom{3}{3}}_{3}$

- c) What is the **probability** your three card hand has both the A and the K? $\frac{1}{\binom{13}{3}}$

- D

- Logan*
- W.W.*
4. Gunn is pondering a new Bell Schedule! In this schedule, there will be three different days, "A" and "B" and "C" In **how many different ways** could we arrange 15 "A days" and 15 "B days" and 15 "C days" over the first 45 days of school?

$$\frac{45!}{(15!)^3}$$

5. At Gunn this year there are 480 seniors, 460 juniors, 470 sophomores and 490 freshmen (1900 total).
- a) Ms. Laurence wants to form a committee to discuss a new tardy policy. She wants a committee of 8 students with exactly two from each grade level. **How many ways** are there for her to do that?

$$\binom{480}{2} \binom{460}{2} \binom{470}{2} \binom{490}{2}$$

- b) If the committee is formed as described above, what is the **probability** that Steve Urkell (a sophomore) is on the committee?

$$\frac{2}{470}$$

6. Gunn High School rented 4 identical Teslas for homecoming! 4 different teachers have volunteered to be drivers. Each car can hold 3 students. Of course, everyone wants to be in Mr. Redfield's car (because he's got a need for speed).

- a. In how many different ways can we divide the 12 students of the Homecoming Court evenly between the four cars? Assume that riding in the front seat is the same as riding in the backseat, but having a different driver DOES change the experience.

12 students into 4 distinct cars

$$\frac{12!}{(3!)^4}$$

- b. Quickly, what is the probability that a student will be in Mr. R's car?

$$\frac{1}{4}$$

✓ 10