

6.8

① 36   36   36   36   36   36  
           2, 176, 782, 336

② 36   35   34   33   32   31  
           1, 402, 410, 240

③ Repeating - More # Combos

10.2/3 Combinations & Probability

Order doesn't matter!

$$n C_r = \frac{n!}{(n-r)! r!}$$

\*  $n = \#$  of things  
\*  $r = \#$  you choose

Cards

52 cards

4 suits:  $\heartsuit \spadesuit \clubsuit \diamondsuit$  ... 13 cards perExample

① Find total # of possible 5 card hands

$$52 C_5 = \frac{52!}{47! 5!} = 2,598,960$$

② How many 5 card hand are all same color?

2 things going on... Color  $\binom{2}{1}$  & pick 5 cards from 26

$$2 C_1 \cdot 26 C_5 = 131,560$$

# Warm-up

How many ways to arrange?

① hockey

$$\underline{6} \underline{5} \underline{4} \underline{3} \underline{2} \underline{1} = 6!$$

= 720 ways

② mayday

letters: 6

Repeats:

a: 2  
y: 2

$$\frac{6!}{2! \cdot 2!} = 180 \text{ ways}$$

③ How many permutations, Choosing 4 letters? (Prob #1)

6 letters, pick 4

$$\underline{6} \underline{5} \underline{4} \underline{3}$$

$${}^6P_4 = 360$$

$$\frac{6!}{(6-4)!} \text{ or } \frac{6!}{2!}$$

hocy } diff  
yhoc }  
yoch }

④ How many combinations, Choosing 4 letters?

$${}^6C_4 = 15$$

$$\frac{6!}{2! 4!}$$

the 4 slots you put the cards or letters

hocy } using same letters, are the same  
yhoc }  
yoch }

Probability =  $\frac{\# \text{ of good outcomes}}{\text{total outcomes}}$

Coin - 2 sides (H/T)

$$P(T) = \frac{1}{2}$$

6 sided dice  
one

$$P(3) = \frac{1}{6}$$

$$P(\text{odd}) =$$

two

$$P(\text{both 3's}) = \frac{1}{6} \cdot \frac{1}{6} = \frac{1}{36}$$

1<sup>st</sup>      2<sup>nd</sup>

# Homework

Find # of 5 card hands:

① 1 ace & 4 that aren't

4 aces

48 are not

$$4^C_1 \cdot 48^C_4 = 194580 = \boxed{778,320}$$

③ All spades

13 spades

$$13^C_5 = \boxed{1287}$$

② 4 kings & 1 other

4 kings

$$4^C_4 \cdot 48^C_1 = 1 \cdot 48 = \boxed{48}$$

Bag of chips numbered 1-50. Find prob:

④ even

⑤ # < 35

⑥ perfect square

⑦ prime #

⑧ Factor of 150

⑨ multiples of 4