

MORE PROBABILITY

Combinations

All must be true.

- 1) No Replacement
- 2) No Order
- 3) Dependent Events
- the 2nd event is influenced by the outcome of the first event.

Individual Probabilities

If Any are true:

- 1) Replacement
- 2) Order
- 3) Independent Events -
the 2nd event is not influenced by the outcome of the 1st event.
* Rolling Dice



Draw 3 + Keep them.

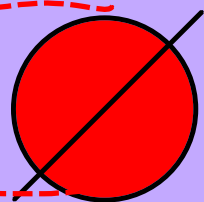
$$P(2 \text{ 100's} + 1 \text{ 50}) = \frac{{}^2C_2 \cdot {}^1C_1}{{}^{14}C_3} = \frac{1}{91}$$

- Combinations
- *No replacement
 - *No order
 - *Dependent

$$\text{Prob}(\text{\$20, then } \text{\$100, then } \text{\$20}) = \frac{8^2}{14} \cdot \frac{2}{13} \cdot \frac{7}{12} = \frac{2}{39}$$

What NOT
to do:

$$\frac{1}{8} \cdot \frac{1}{2} \cdot \frac{1}{7}$$



Pick 1 bill. Draw, put back, draw.

$$\text{Prob}(\text{\$20, put back, } \text{\$50}) = \frac{8}{14} \cdot \frac{4}{14} = \frac{8}{49}$$

- Combinations
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Mutually Inclusive/Exclusive Events

AND = *
OR = +

Deck of cards - Draw 1 card

Prob(ace or black card)

$$\frac{4}{52} + \frac{26}{52} - \frac{2}{52}$$

must subtract duplicates

mutually inclusive

Only with "OR" problems

Mutually Inclusive Events - share common items

Mutually Exclusive Events - share No common items.

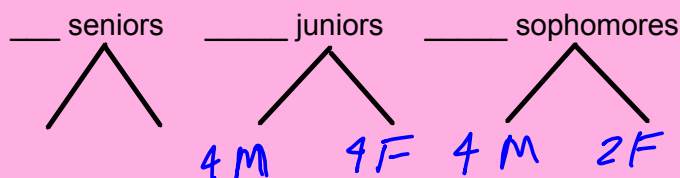
Draw 2 cards. Prob(²face cards OR ²red)

Common items?
yes

$$\frac{{}^{12}C_2 + {}^{26}C_2 - {}^6C_2}{{}^{52}C_2} = \frac{55}{221}$$

Combinations
*No replacement
*No order
*Dependent

Odds = $\frac{55}{166}$



$$\frac{14}{13} = \frac{182}{182}$$

Select 3 people to earn extra Homework coupon.

Prob(3 juniors or 3 females) ← Duplicates

$$\frac{8C_3 + 6C_3 - 4C_3}{14C_3} = \frac{56 + 20 - 4}{364} = \frac{72}{364} = \frac{18}{91}$$

Pick 5 students.

Prob(at least 3 males)

(3M+2F) OR 4M1F OR 5M

$$\frac{8C_3 + 6C_2 + 8C_4 + 6C_1 + 8C_5}{14C_5}$$

AT LEAST
 AT MOST
 No More Than

 Write out all
 possibilities
 using OR.