

MORE PROBABILITY

Combinations

All must be true

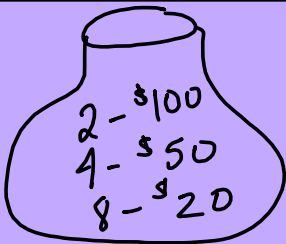
- 1) No Replacement
- 2) No Order
- 3) Dependent event -
2nd event depends upon
the outcome of the 1st event

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, flipping coins

same chance
every time



Draw 3 & Keep them.

$P(2 \text{ } 100\text{'s} + 1 \text{ } 50)$

$$\frac{{}^2C_2 \cdot {}^4C_1}{{}^{14}C_3} = \frac{1}{91}$$

Combinations

*No replacement

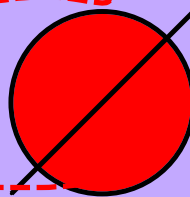
*No order

*Dependent

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

What NOT
to do:

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



Pick 1 bill. Draw, put back, draw.

$\text{Prob}(\text{Pick } \$20 \text{ Put back Pick } \$50)$

$$\frac{4}{7} \cdot \frac{2}{14} \cdot \frac{2}{14} = \frac{8}{49}$$

Combinations

*No replacement

*No order

*Dependent

Mutually Inclusive/Exclusive Events

Deck of cards - Draw 1 card

Prob(ace or black card)

$$\frac{4}{52} + \frac{26}{52} - \frac{2}{52} = \frac{28}{52} = \frac{7}{13}$$

Only with "OR" problems

Mutually Inclusive Events — Share common items
Subtract duplicate items

Mutually Exclusive Events — share No common items.

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

Common items?

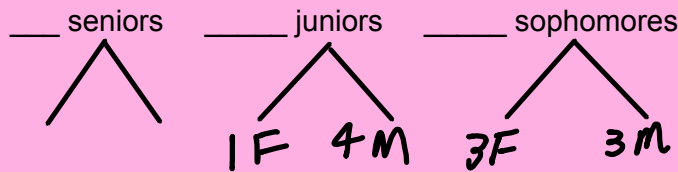
$$\frac{{}_{12}C_2 + {}_{26}C_2 - {}_6C_2}{{}_{52}C_2} \approx 0.284$$

Combinations

*No replacement

*No order

*Dependent



Select 3 people to earn extra homework coupon.

Prob(3 juniors or 3 males)

$$\frac{{}_5C_3 + {}_7C_3 - {}_4C_3}{{}_{11}C_3} = \frac{10 + 35 - 4}{165} = \frac{41}{165} \approx 0.248$$

Pick 5 students.

Prob(Select at least 3 males) Odds = $\frac{41}{124}$

$$\frac{{}_3C_3 \cdot {}_4C_2 + {}_7C_4 \cdot {}_4C_1 + {}_7C_5}{{}_{11}C_5}$$

$$\frac{35 \cdot 6 + 35 \cdot 4 + 21}{66} = \frac{53}{66}$$

$$\text{Odds} = \frac{53}{13}$$

At Most
No More Than
Write out all
possibilities
using OR.

