For the following slides:

enter the appropriate notes/equations on the handout given today in class for ch.14 probability

(see link on website to print note sheet)

Notes: 14.2 Probability

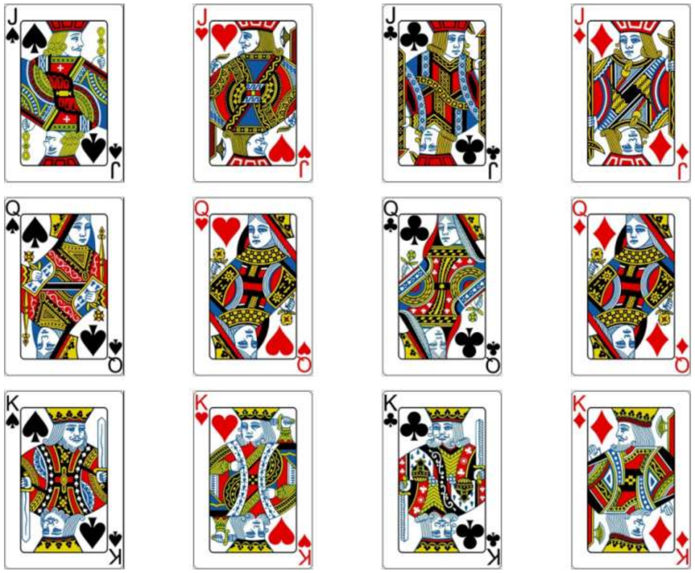
independent events: events that do not affect each other *(rolling dice)*

dependent events: events that do affect each other *(choosing cards from a deck without replacement)*

Already included on note sheet…just read the definitions

Standard deck of playing cards:

- 52 cards → 4 suits (spades, hearts, clubs, diamonds)
- Each suit has 13 cards
- Face cards: Jack, Queen, King



- Aces are low unless stated otherwise (Ace = 1)

Already on note sheet for reference

Probability: $\dfrac{\#\,of\ desired\ outcomes}{total\ \#\ of\ outcomes}$

Sample space: set of all outcomes

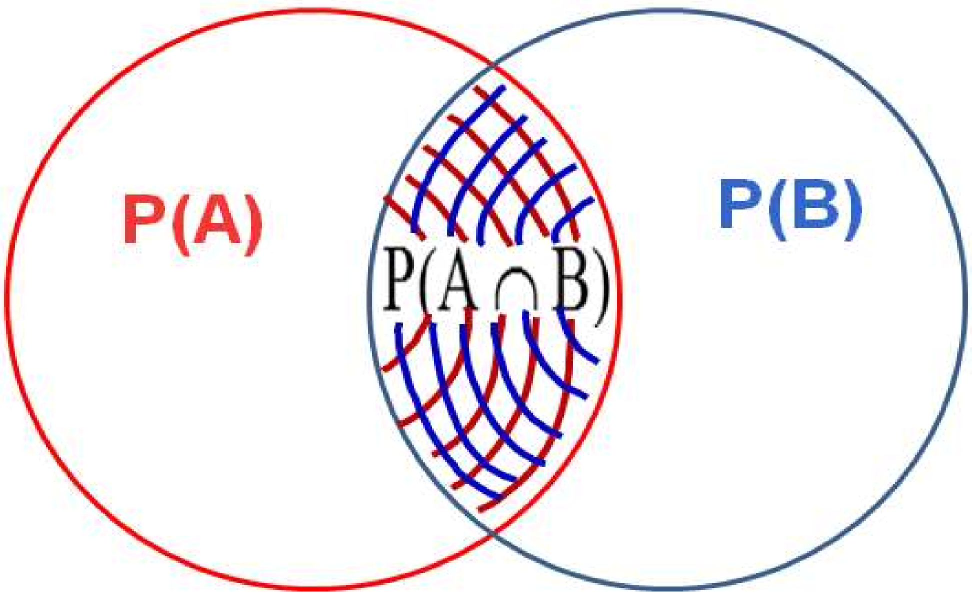
P(A) = probability of event A

P(A') = probability of event A *not* happening

P(A) and P(A') are called *complements* → $P(A) + P(A') = 1$

P(A and B) = P(A)•P(B)

$P(A \cap B) \rightarrow$ *the "intersection" of A and B*



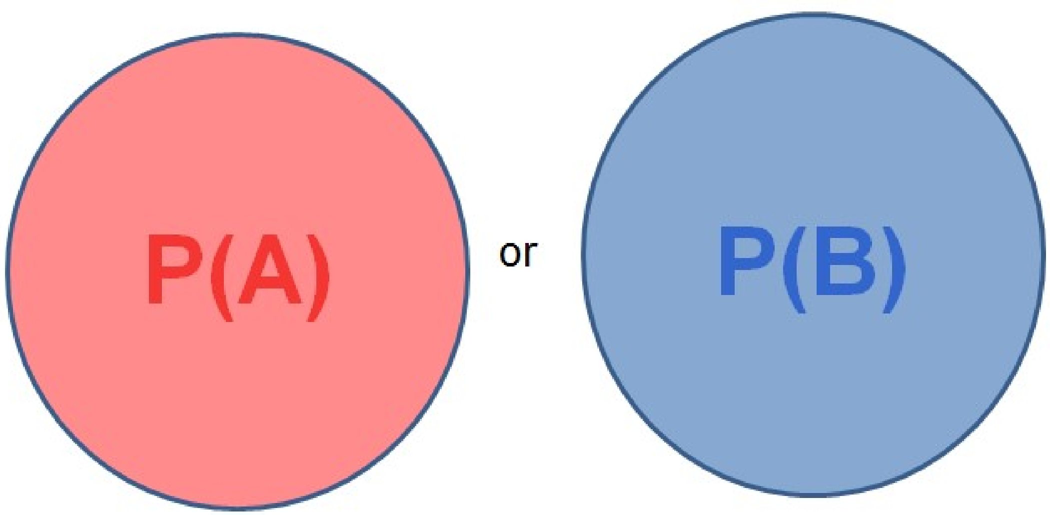
Venn Diagram:

overlapping (intersecting) area of the two circles represents the overall probability.

Mutually exclusive events cannot happen at the same time.

P(A or B) = P(A) + P(B)

$P(A \cup B) \rightarrow$ *the "union" of A&B*



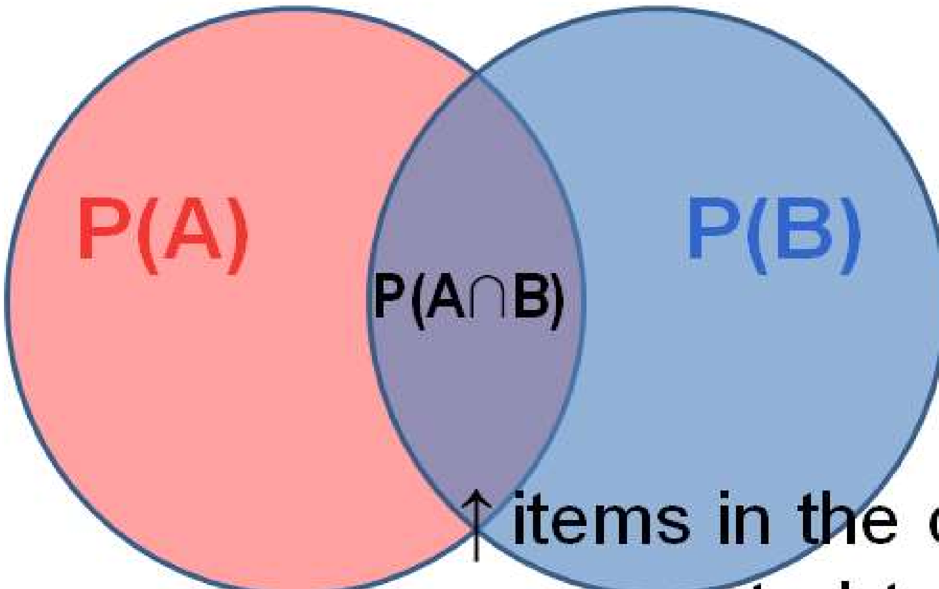
Venn Diagram:
the overall probability is the sum of the area of the two circles.

If events are **NOT mutually exclusive**, then some objects can satisfy (include) the conditions of both events.

P(A or B) = P(A) + P(B) – P(both)

sum of the areas *overlap*

$P(A \cup B) =$



↑items in the overlapping area are counted twice, so subtract.

Conditional Probability reduces the sample space since an event has already occurred.

$P(A|B) =$ the probability of "event A" given "event B."

Due tomorrow:

14.2 #7-13odd,
15-18,
21-39odd

Set up problem using proper notation, then find the probability. Show work when possible!!

Note: #7,9,11,13,18 →just a ***single item is being chosen,*** therefore no work is required (write proper notation & answer)

Hint for #15,16,17:

use C(n, r) to find all possible arrangements when ***choosing multiple items.*** Show work!

7–20 ■ Probability by Counting These exercises involve finding probabilities by counting.

7. An experiment consists of tossing a coin twice.

(a) Find the sample space. HH HT TH TT

(b) Find the probability of getting heads exactly two times.

$P(2H) = \frac{1}{4}$

(c) Find the probability of getting heads at least one time.

$P(\text{at least } 1H)$ or $P(H \geq 1) = \frac{3}{4}$

(d) Find the probability of getting heads exactly one time.

$P(1H) = \frac{2}{4}$ or $\frac{1}{2}$

15. A poker hand, consisting of five cards, is dealt from a standard deck of 52 cards. Find the probability that the hand contains the cards described.

(a) Five hearts

$$\frac{{}_{13}C_5}{{}_{52}C_5} = \frac{1287}{2,598,960} \approx .000495$$

(b) Five cards of the same suit

(c) Five face cards

(d) An ace, king, queen, jack, and a ten, all of the same suit (royal flush)

CHECK EVEN ANSWERS:

16. a) $$\frac{C(4,3)}{C(12,3)} = \frac{4}{220}$$

$$= \frac{1}{55}$$

$$\approx 0.018 \text{ or } 1.8\%$$

b) $$\frac{C(8,3)}{C(12,3)} = \frac{56}{220}$$

$$= \frac{14}{55}$$

$$\approx 0.255 \text{ or } 25.5\%$$

18. a) $\frac{3}{16}$ b) $\frac{3}{8}$ c) $\frac{5}{8}$