

5.2 - Probability Rules

Notes provided by **E. Kelly Pendleton** from **Ardrey Kell High School**, including:

- the idea of probability
- myths about randomness
- simulation

adjust as you wish

***email elizabethk.pendleton@cms.k12.nc.us**

if you need the flipchart version*

5-2: Simple Probability

Sample space - the set of all possible outcomes.

Multiplication principle - used to get the number in a sample space.

If you can do one task in **a** number of ways and a second task in **b** number of ways, then both can be done in **a*b** number of ways.

$P(A) =$

$P(A^c) = \text{complement} = 1 - P(A)$

Multiplication Principle

1. If a license tag consists of 4 letters and 2 digits, how many combinations are possible?

2. If a license tag consist of 3 letters with no repetition and 3 digits, where the first cannot be zero, how many combinations are possible?

3. How many phone numbers are possible with an area code of 704? (Hint: the first digit cannot be 0, the first 3-digits cannot be 411 or 911).

Rules of Probability

1. $0 \leq P(A) \leq 1$
2. all probabilities in a sample space sum to 1
3. $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$
4. mutually exclusive events: $P(A \text{ and } B) = 0$
events that share no outcomes
5. independent events: $P(A \text{ and } B) = P(A) * P(B)$
events that have no effect on each other

Symbols

\cup \cap \subset

a standard deck of cards: 52 total cards

-4 suits (hearts, spades, clubs, & diamonds), 13 of each

-13 cards (2-10, Jack, Queen, King, Ace)

-2 red suits, 2 black suits (26 red, 26 black)

Find the following probabilities:

a) $P(\text{red}) =$

b) $P(\text{Queen}) =$

c) $P(\text{red and Queen}) =$

d) $P(\text{red or Queen}) =$

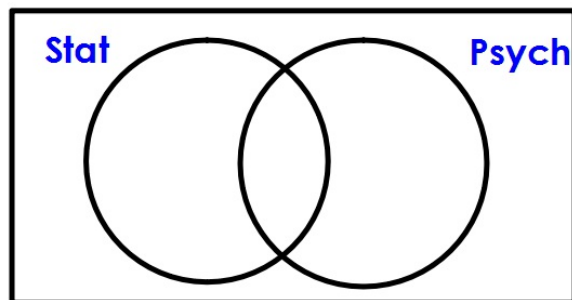
e) $P(\text{spade}) =$

f) $P(\text{spade or club}) =$

28% of the senior class takes AP Statistics, 23% takes AP Psychology, and 18% take both.

a). Make a two-way table for this scenario.

b). Make a Venn diagram that models the chance process using event S = the student takes AP Statistics & event P = the student takes AP Psychology.



c). Find the probability that a student is in AP Stats or AP Psych.

d). Find the probability that a student is in neither AP course.

e). Find the probability that a student is in AP Stats, but not AP Psych.