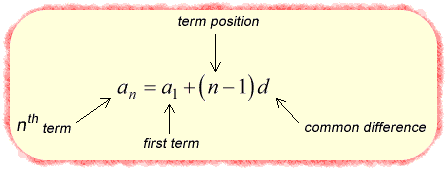
**Itinerary**

# Graph Theory

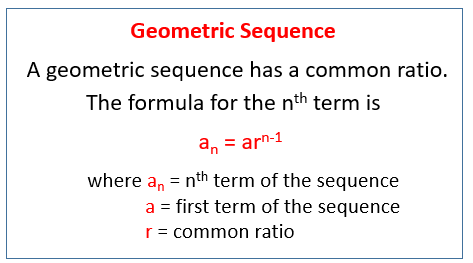
* Terms - please refer to [this quizlet set](https://quizlet.com/339959458/graph-theory-flash-cards/)
  + Bipartite will NOT be on the exam
* Shortest path (Dijkstra’s Algorithm)
* Trees
  + [Spanning](https://www.tutorialspoint.com/discrete_mathematics/images/graph_in_span.jpg)
    - [Minimal Spanning Tree](https://www.tutorialspoint.com/discrete_mathematics/images/spanning_tree.jpg)
    - Prim’s Algorithm
      * [Video](https://www.youtube.com/watch?v=YyLaRffCdk4)
* [Hamiltonian Graphs](https://upload.wikimedia.org/wikipedia/commons/thumb/6/60/Hamiltonian_path.svg/200px-Hamiltonian_path.svg.png)
  + Ore’s Theorem
  + Visit every vertex only once
* Directed Graph
  + Indegree and outdegree
    - How many edges feed in and out of a given vertex
  + [Strongly](https://www.geeksforgeeks.org/wp-content/uploads/connectivity3.png)/[Weakly connected](https://i.ytimg.com/vi/A7iByRFzEy4/maxresdefault.jpg) graphs

# Combinatorics

* [Combinations vs. Permutations](https://medium.com/i-math/combinations-permutations-fa7ac680f0ac)
  + Combinations are when all the possible ways a set of data can be ordered and the order in which they are recited does not matter. A good example would be all the bit strings possible for a given chunk of data. For a permutation, the order in which the data is sorted does matter, in the case of a lock on a locker.
* Sequences
  + Arithmetic (adding/subtracting)



* + Geometric (multiplying and dividing)



* Pigeonhole Principle (Enough for T/F question)
* Binomial Theorem
* Bit strings (Combination)
  + License plate

# Recurrence Relations

* Solving using characteristic roots
  + System of equations

# Probability

* 4 step method
  + Tree diagrams
* Poker hands (conceptual)
  + Example of 400 cards
    - Al spades, two reds in a row.
    - Refer to example went over in class
* Conditional
  + Picking marbles from a bag
  + The halting problem
    - You are more likely to win if you have won the previous game
* Three Card Riddle
  + Know how it works!
  + Given 5 Cards
    - Two all red
    - Two red/blue
    - One all blue

|  |  |
| --- | --- |
| R1 | R2 |
| R3 | R4 |
| R5 | B1 |
| R6 | B2 |
| B3 | B4 |

* + I place a card with the side showing red, what is the probability of the other side being red
    - Count all the cards possible : 10
    - Count all the ones that are red : 6
    - 6/10
      * 2/3 chance of the other side being red