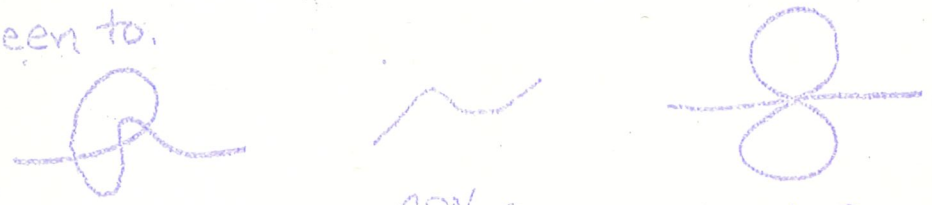
DN: The crossing number of a path is the number of times it comes back to a vertex it has already been to.

Ex 

CRN = 3 CRN = 0 CRN = 3.

DN A SIMPLE PATH is one that does not repeat any vertex. (i.e. it's crossing number is zero)

THM A: If there is a path $x \to y$ in G, then there is a simple path $x \to y$ in G.

COR B: In a tree every path is a simple path.

DN: A TOUR is a sequence of vertices $x_0, x_1, \ldots x_n$ so that x_k is adjacent to x_{k+1} for $0 \le k < n$. (i.e. a path that can repeat edges).

DN: The revisit number of a tour is the number of times it comes back to an edge it has already been to. (Note a tour with rev no = 0 is a path)

Thm C: If there is a tour $x \to y$ in G, then there is a path $x \to y$ in G.

Corr D If there is a tour $x \to y$ in G, then there is a simple path $x \to y$ in G

TEST PROBLEM #7 Prove Thm A, Corr B, Thm C & Cor D

Hint prove Thm A (resp Thm C) by induction on the CR NO (resp REV No)