\# of edges \leq 3n - 6

Sum of degrees \leq 6n - 12

\textcircled{6n} > 6n - 12
\( x_i \) \[ x_{i+1}, x_{i+2}, \ldots, x_n \]

at most 5
at most 6 colors
H is a minor of G

(1) delete a vertex
(2) delete an edge
(3) contract an edge.
\[ G \rightarrow H \]
\[ G = M H \]
G = M14
Topological minor

H

TH

H₁
If $G$ is planar, then

$H = K_5 \text{ or } K_{3,3}$

$TK_5 \text{ or } TK_{3,3}$
$X$ with

$\Delta(X) \leq 3$

$X = \kappa_{3,3}$
K₅ minor or K₃,₃ minor

For G, then G has also a
K₅ topological minor or
K₃,₃ topological minor
$G$ is 3-connected and without a $K_5$ or $K_{3,3}$ minor. Then it is planar.