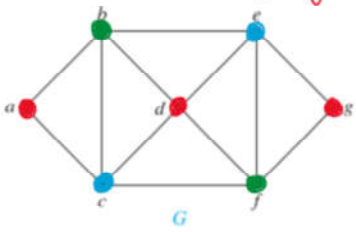
L-28 Coloring

Tuesday, April 12, 2022 9:59 AM

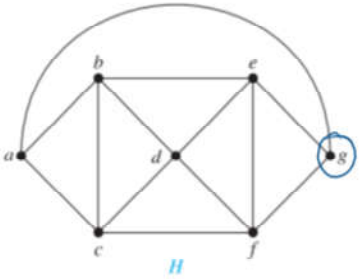
The Chromatic Number of graph G is ?



G

$\chi(G) = 3$

3-Colorable graph.



H

(a) 2

(b) 3

(c) 4 ✓

(d) None of these

4-Colorable graph.

Note

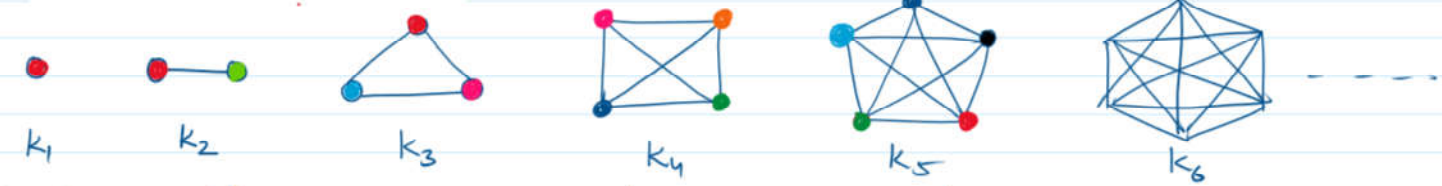
Theorem : Five Colour Theorem : If G is planar graph then $C(G) \leq 5$.

THE FOUR COLOR THEOREM The chromatic number of a planar graph is no greater than four.

Ex

What is the chromatic number of K_n?

K_n = Complete graph with n-Vertices.



K_1 1-Color

K_2 2-Color

K_3 3-Colors

K_4 4-Color

K_5 5-Color

K_6 6-Color

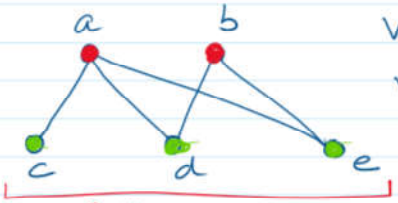
∴ Chromatic Number of $K_n = n$

Ex

Chromatic Number = ?

(a) 1 (b) ✓ 2 (c) 3

(d) 4.



$V_1 = \{a, b\}$

$V_2 = \{c, d, e\}$

Bipartite graph.

Q

What is the chromatic number of the complete bipartite graph $K_{m,n}$, where m and n are positive integers?

$\chi(K_{m,n}) = 2$ 2-Colorable

Q

The following are equivalent for a graph G:

a — e — b — d — a

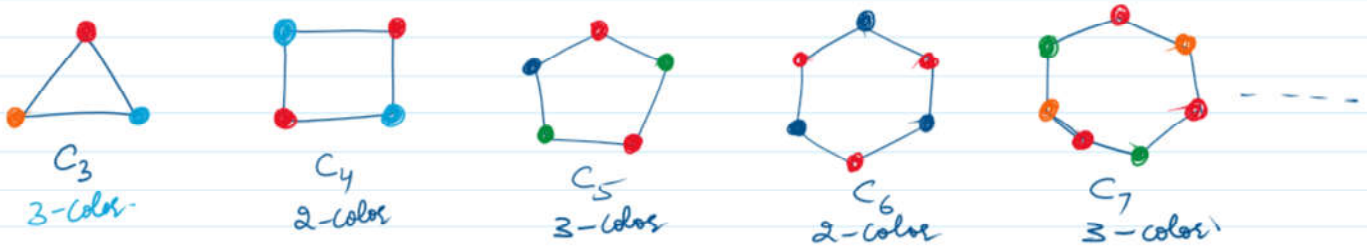
Length = 4

Q. The following are equivalent for a graph G:

(i) G is 2-colorable.
(ii) G is bipartite.
(iii) Every cycle of G has even length.

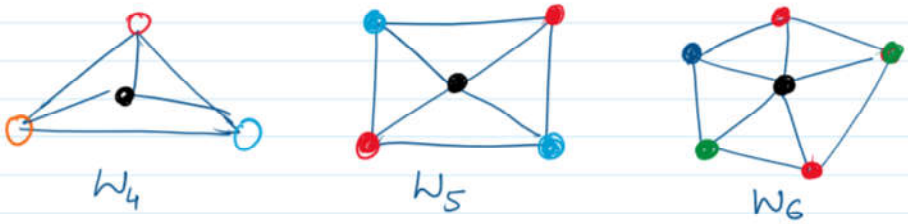
a — e — b — d — a
Length = 4
b — d — a — e — b
Length = 4

Ex Q. What is the chromatic number of the graph C_n where $n \geq 3$? (Recall that C_n is the cycle with n vertices.)



Chromatic Number of C_n = $\begin{cases} 2 : n \text{ is Even} \\ 3 : n \text{ is odd.} \end{cases}$

Q. :→ Chromatic Number of Wheel Graph W_n. n: Total No. of Vertices in Wheel graph



$\chi(W_n) = \begin{cases} 4 : n \text{ is Even Number} \\ 3 : n \text{ is odd Number.} \end{cases}$

$\chi(W_n) = \begin{cases} 3 : n \text{ is Even} \\ 4 : n \text{ is odd.} \end{cases}$

n : No. of Vertices in the Circumference Boundary
↓
Total No. of Vertices = n+1