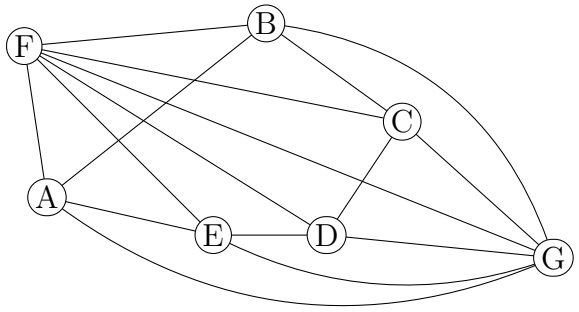
CS 173, Spring 2016
Examlet 7, Part B

NETID:	
FIRST:	**LAST:**

Discussion: Monday 9 10 11 12 1 2 3 4 5

1. (9 points) What is the chromatic number of graph G (below)? Justify your answer.



2. (6 points) Check the (single) box that best characterizes each item.

$\sum_{k=3}^{n} k^7$ $\sum_{p=1}^{n-2} p^9$ ☐ $\sum_{p=1}^{n-2} (p+2)^7$ ☐ $\sum_{p=1}^{n-2} k^9$ ☐ $\sum_{p=1}^{n-2} k^7$ ☐

Suppose I want to estimate $\frac{103}{20}$. 10 is _____ an upper bound ☐ a lower bound ☐ an exact answer ☐ not a bound on ☐

The chromatic number of W_n. 2 ☐ 3 ☐ ≤ 3 ☐ ≤ 4 ☐

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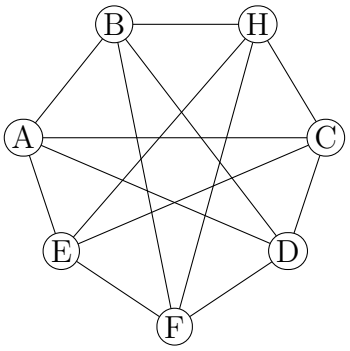

2. (6 points) Check the (single) box that best characterizes each item.

$\sum_{k=0}^{n} \frac{1}{2^k}$ $1-(\frac{1}{2})^{n-1}$ ☐ $2-(\frac{1}{2})^{n}$ ☐ $1-(\frac{1}{2})^{n}$ ☐ $2-(\frac{1}{2})^{n-1}$ ☐

All elements of M are also elements of X. $M = X$ ☐ $M \subseteq X$ ☐ $X \subseteq M$ ☐

Chromatic number of a bipartite graph with at least two vertices. 1 ☐ 2 ☐ 3 ☐ can't tell ☐

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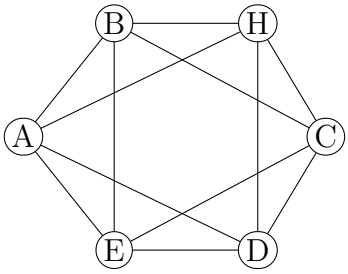

2. (6 points) Check the (single) box that best characterizes each item.

Chromatic number of G $\mathcal{C}(G)$ ☐ $\phi(G)$ ☐ $\chi(G)$ ☐ $\| G \|$ ☐

$\sum_{k=1}^{n} \frac{1}{2^k}$ $1 - (\frac{1}{2})^{n-1}$ ☐ $2 - (\frac{1}{2})^{n}$ ☐ $1 - (\frac{1}{2})^{n}$ ☐ $2 - (\frac{1}{2})^{n-1}$ ☐

All elements of X are also elements of M. $M = X$ ☐ $M \subseteq X$ ☐ $X \subseteq M$ ☐

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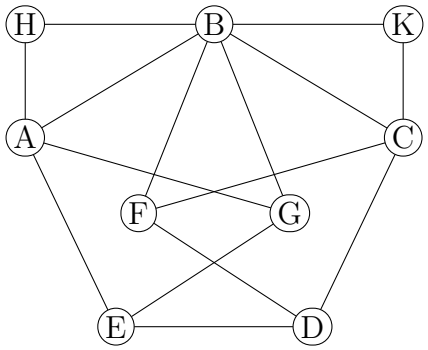
1. (9 points) What is the chromatic number of graph G (below)? Justify your answer.



2. (6 points) Check the (single) box that best characterizes each item.

10 people rowed across Lake Tahoe in my canoe. 10 is _____ how many people the canoe can carry.

an upper bound on ☐ exactly ☐
a lower bound on ☐ not a bound on ☐

$\sum_{i=1}^{p-1} i$

$\frac{p(p-1)}{2}$ ☐ $\frac{(p-1)^2}{2}$ ☐ $\frac{p(p+1)}{2}$ ☐ $\frac{(p-1)(p+1)}{2}$ ☐

The chromatic number of a graph with maximum vertex degree D

$= D$ ☐ $= D+1$ ☐
$\leq D+1$ ☐ $\geq D+1$ ☐

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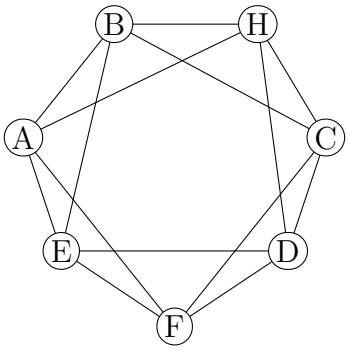
1. (9 points) What is the chromatic number of graph G (below)? Justify your answer.



2. (6 points) Check the (single) box that best characterizes each item.

Leal team's bridge held 100 pounds without collapsing. 100 pounds is ____ on how much the bridge can hold.

an upper bound on ☐ exactly ☐
a lower bound on ☐ not a bound on ☐

$\sum_{k=3}^{n} k^7$ $\sum_{p=1}^{n-2} p^9$ ☐ $\sum_{p=1}^{n-2} k^7$ ☐ $\sum_{p=1}^{n-2} k^9$ ☐ $\sum_{p=1}^{n-2} (p+2)^7$ ☐

Graph H is a subgraph of W_7. 4 is a ____ the chromatic number of H.

an upper bound on ☐ exactly ☐
a lower bound on ☐ not a bound on ☐

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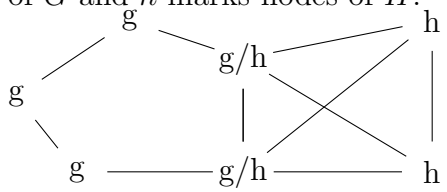
1. (11 points) If G is a graph, recall that $\chi(G)$ is its chromatic number. Suppose that G is a graph with at least one edge and H is another graph with at least one edge, not connected to G. Now, pick a specific edge e from G and an edge f from H and merge the two edges, creating a combined graph T. For example, suppose that G is C_5 and H is K_4. Then T might look as follows, where g marks nodes of G and h marks nodes of H.



Describe how $\chi(T)$ is related to $\chi(G)$ and $\chi(H)$, justifying your answer.

2. (4 points) Check the (single) box that best characterizes each item.

$\sum_{k=0}^{n-1} \frac{1}{2^k}$ $\quad 1-(\frac{1}{2})^{n-1}$ ☐ $\quad 2-(\frac{1}{2})^{n}$ ☐ $\quad 1-(\frac{1}{2})^{n}$ ☐ $\quad 2-(\frac{1}{2})^{n-1}$ ☐

$\tau \leq 1.3$ $\quad$ an upper bound on τ ☐ $\quad$ exactly τ ☐

a lower bound on τ ☐ $\quad$ not a bound on τ ☐