Last name	
First name	

## LARSON—MATH 356—CLASSROOM WORKSHEET 19 Chromatic Polynomials

Our goal now is to *count* the number of K-colorings of a graph G.

1. (Notation). If e = (v, w) is an edge in graph G, what is  $G - \{e\}$ ?

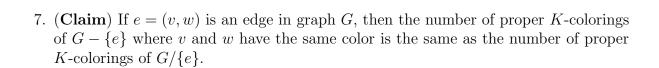
2. (Notation). If e = (v, w) is an edge in graph G, what is  $G/\{e\}$ ?

3. What is a proper K-coloring of a graph G?

4. Find the number of proper K-colorings of a complete graph  $K_n$ .

5. Find the number of proper K-colorings of an empty graph  $E_n$ .

6. Find the number of proper K-colorings of a path graph  $P_n$ .



8. What is 
$$P(K;G)$$
?

9. Why does 
$$P(K; G - \{e\}) = P(K; G/\{e\}) + P(K; G)$$
?

10. What is an algorithm for computing P(K; G)?

11. What is the complexity of this algorithm?