

There are 20 problems, each worth 10 points on 8 Pages

Circle your answers.

Math 574 Final Exam 1987

Name \_\_\_\_\_

- ① How many words of length 5 can be made from the alphabet  $\{a, b, c\}$ ?
- ② How many 6 element subsets does a 10 element set have?
- ③ (a) Suppose  $G$  is a tree with  $n$  vertices and  $e$  edges. Give a formula which relates  $n$  and  $e$ .
- (b) Give an example of a graph which satisfies the formula in (a) but is not a tree.
- ④ Solve the recurrence relation  $a_n = a_{n-2}$ ,  $a_0 = 4$ ,  $a_1 = 6$ .
- ⑤ What is the chromatic polynomial  $P(G, x)$  of the following graph?
- ⑥ Draw a graph with chromatic polynomial equal to  $P(G, x) = x^4 (x-1)^3 (x-2)^3 (x-3)^2 (x-4)$
- ⑦ (a) In a graph with 16 edges, what is the minimum possible number of vertices?
- (b) In a connected graph with 16 edges, what is the maximum possible number of vertices?