

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 $\{a, b, c\}$?

$$3^5$$

② How many 6 element subsets does a 10 element set have?

$$\binom{10}{6} = \frac{10 \cdot 9 \cdot 8 \cdot 7}{4 \cdot 3 \cdot 2 \cdot 1} = 210$$

③ (a) Suppose G is a tree with n vertices and e edges. Give a formula which relates n and e .

$$n = e + 1$$

(b) Give an example of a graph which satisfies the formula in (a) but is not a tree.



$$n = 5$$
$$e = 4$$

④ Solve the recurrence relation $a_n = a_{n-1} + a_{n-2}$, $a_0 = 4$, $a_1 = 6$.

$$x^2 - 1 = 0$$

$$x = 1, -1$$

$$a_n = \lambda_1 + \lambda_2(-1)^n$$

$$4 = \lambda_1 + \lambda_2$$

$$6 = \lambda_1 - \lambda_2$$

$$10 = 2\lambda_1$$

$$5 = \lambda_1$$

$$-1 = \lambda_2$$

$$a_n = 5 - (-1)^n$$