Mathematics 433   Fall 2007   In Class Exercises

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Name

Directions: Be sure to include in-line citations, including page numbers if appropriate, every time you use the results of discussion, a text, notes, or technology. **Only write on one side of each page.**

Due September 28

1. Prove the following Theorem.

   Let P be a permutation matrix associated with the permutation $p : S \rightarrow S$ where $S = \{1, 2, 3, \cdots, n\}$. Then

   (a) The j th column of P is $\vec{e}_{p(j)}$

   (b) P is the sum of n matrix units: $P = \vec{e}_{p(1),1} + \vec{e}_{p(2),2} + \vec{e}_{p(3),3} + \cdots + \vec{e}_{p(n),n}$

   (c) Every row and every column of P has a single 1 and all other entries 0.

   (d) Any matrix that satisfies property c. above is a permutation matrix.