Linear Algebra
C Term, Sections C01-C04
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Linear Algebra Assignment 1

DUE DATE: Wednesday, January 16, noon. Deliver to your conference PLA.

N.B. No late assignments will be accepted for credit. Sample solutions will be available at noon and **as soon as** they are handed out, PLA's are **not permitted** to accept late assignments. Any case of harassment of PLA's in this regard is to be reported to the instructor.

PROFESSOR MARTIN'S RULES FOR LINEAR ALGEBRA ASSIGNMENTS:

- Write neatly, using correct English.
- Use **only one side** of each sheet of paper. Ink on the back of the page deteriorates the readability of what is on the front.
- Explain your steps. A correct answer with no explanation will earn a grade of zero.
- Use a staple when you submit more than one sheet and want them all back. There is a stapler for public use in the Mathematical Sciences Department Office (SH108).

Please complete the following four problems:

1. Do problem # 28 on page 9. Explain your solution in complete sentences.
2. Do problem # 6 on page 29. (When the answer is defined, show your intermediate work. When it is not defined, explain why not.)
3. **(a)** Find all values r and s for which

$$\begin{pmatrix} r & 0 & 0 \\ 0 & s & 0 \\ 0 & 0 & 2 \end{pmatrix} \quad \text{commutes with} \quad \begin{pmatrix} 3 & 1 & 1 \\ 1 & 4 & 1 \\ 1 & 1 & 3 \end{pmatrix}.$$

Terminology: Two $n \times n$ matrices A and B **commute** if $AB = BA$.

(b) Find a value of r for which the matrix

$$C = \begin{pmatrix} 1 & 0 & 0 \\ 0 & \frac{1}{2} & \frac{\sqrt{3}}{2} \\ 0 & \frac{\sqrt{3}}{2} & r \end{pmatrix}$$

squares to the identity. (That is, for what value of r will we have $C^2 = I_3$?)

4. Do problem T.18 on page 42.