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Cover Sheet for 2014-2015 Spring Semester MATH 3210/5210 (Barsamian) Homework 10
(Due at the start of class on Friday, April 24, 2014. Staple this cover sheet to your work.)

Problem:	1	2	3	4	Total	Rescaled
Your Score:						
Possible:	25	25	25	25	100	10

Reading: In Chapter Five, *Similarity*, read Section II (also called *Similarity*). There are three subsections:
Five.II.1: Similarity: Definition and Examples (p. 386 - 387)
Five.II.2: Diagonalizability(p. 389 - 392)
Five.II.3: Eigenvalues and Eigenvectors (p. 393 - 400)

Suggested Exercises: Five.II.1 Exercises # 4, 6, 7, 11, 18 (p. 387 - 388)
Five.II.2 Exercises # 7, 8, 9, 10, 11, 14, 15, 17, 18 (p. 392 - 393)
Five.II.3 Exercises # 20, 21, 23, 25, 27, 28, 31, 33, 40 (p. 400 - 402)

Note: You are encouraged to check your computations using online tools, but the written work that you turn in should have complete details of all computations and clear explanations. Unjustified answers will get no credit.

[1] (i) Find the inverse, if it exists, by using the Gauss-Jordan Method. (ii) Check by multiplying. (Show details of all computations.)

(a) $\begin{pmatrix} 2 & 1 \\ 3 & 0 \end{pmatrix}$ (b) $\begin{pmatrix} -1 & 3 \\ 4 & -12 \end{pmatrix}$ (c) $\begin{pmatrix} 3 & -2 & 1 \\ -3 & 3 & -2 \\ 1 & -1 & 1 \end{pmatrix}$

[2] Find the general formula for the positive powers of the diagonal matrix $D = \begin{pmatrix} D_{1,1} & \cdots & 0 \\ \vdots & \ddots & \vdots \\ 0 & \cdots & D_{m,m} \end{pmatrix}$.

That is, find find a formula for D^k for $k > 0$.

[3] Prove that if square matrices A and B are similar, then A^k and B^k are similar for all positive integers k.

[4] For the matrix $M = \begin{pmatrix} 3 & 4 \\ 1 & 6 \end{pmatrix}$, which of the vectors $\vec{u} = \begin{pmatrix} 2 \\ 1 \end{pmatrix}$ and $\vec{v} = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$ and $\vec{w} = \begin{pmatrix} 8 \\ -2 \end{pmatrix}$ are eigenvectors? Explain.