

- 1) Answer TRUE or FALSE:
 - a) Two row equivalent matrices must have the same rank and the same nullity.
 - b) Two row equivalent matrices must have the same column space.
 - c) If A is similar to I , then $A = I$ (I is the identity matrix).
 - d) The rank of A is the number of rows or the number of columns of A , whichever is smaller.
 - e) If A is similar to B and $A^4 = 3I$, then $B^4 = 3I$.
- 2) Find the matrix representation of the rabbit transformation, $L : R^2 \rightarrow R^2$, where $L((x_1, x_2)^T) = (x_1 + x_2, 2x_1)^T$. [Standard basis].
- 3) Choose ONE of these.
 - a) Prove that $\text{Ker}(L)$ is a subspace of V (if $L : V \rightarrow W$ is linear).
 - b) Find the transition matrix A from $B = \{e_2, e_1\}$ to $C = \{e_1 + e_2, e_2\}$ (two nonstandard bases of R^2).
 - c) Prove that if A is similar to B then $\det A = \det B$.

Remarks and Answers: The average for Quiz 5 was about 53 (good!). The unofficial scale is: A's 55-60, B's 50-54, C's 45-49, D's 39-44.

I have computed the average of your best 4 out of 5 quiz grades. Assuming that you are doing OK on the HW and the Matlab HW, this is probably a good estimate of how you are doing so far (but a bit high). The class average for this score is about 51/60. The current scale is: A's 54-60, B's 49-53, C's 43-48, D's 37-42. Also, see the upper right corner of your Quiz 5. Answers:

- 1) TFTFT
- 2) This is from our in-class example about the rate of growth of a rabbit population. But even if you haven't seen that, it doesn't really matter. You can get the columns of A one at a time, as usual, from $L((1, 0)^T)$ etc.

$$A = \begin{pmatrix} 1 & 1 \\ 2 & 0 \end{pmatrix}$$

- 3) See the text for 3a) (and see the AM key for more about the other half of Thm 4.1.1). Like most Ch 4.3 proofs, part c) is pretty easy:

Assume that A is similar to B , so $A = S^{-1}BS$. Taking the det of both sides, using the main Thm of Ch 2.2, $\det A = \det S^{-1} \det B \det S$. But $\det S^{-1} \det S = \det I = 1$, so $\det A = \det B$. Done.