Exam TI1206M, 05 − 07 − 2018, Open Questions

Name: **Student ID:**

*write **readable** and underline your <u>last name</u>*

21. Recall: The row space of a matrix is the column space of its transpose: $\text{Row}\,A = \text{Col}\,A^T$.
For each part: Give an **example** or an **argument** why such an example does not exist.

a. ☐2 Give an example of a 2×2 matrix A for which $\text{Row}\,A = \text{Col}\,A$.

*Write **readable** !!!*

b. ☐3 Give an example of a 2×2 matrix A for which $\text{Col}\,A = \text{Nul}\,A$.

c. ☐3 Give an example of a 2×2 matrix A for which $\text{Nul}\,A = \text{Row}\,A$.

22.a. [2] Give the definition (according to Lay ;-): λ is an eigenvalue of the matrix A if ....

Prove or disprove (by an explicit counterexample) the following statements:

Tip: *First work this out on scratch paper.*

22.b. [2] If λ is an eigenvalue of the $(n \times n)$ matrix A, then λ is also an eigenvalue of A^T.

22.c. [2] If a 3×3 matrix A has the eigenvalues 1, 2 and -2, then A is invertible.

*Write **readable !!!***

22.d. [3] If an $n \times n$ matrix A is invertible, then A is diagonalizable.