Royal University of Phnom Penh
Faculty of Sciences
Department of Mathematics

Mid-term
Linear Algebra I: October 28, 2023
Duration: 2 hours
Lecturer: Dr. SENG Monyrattanak

Problem 5

In the cartesian plane, show that the graph $y = 3x^2 - x^3$ is the reflection in the x-axix of the rotation $90°$ clockwise of the graph $y^3 - 3y^2 + x = 0$.

Problem 6

Show that the equations

$$\begin{aligned} 2x + y + z &= -6\alpha \\ 2x + y + (\beta + 1)z &= 4 \\ \beta x + 3y + 2z &= 2\alpha \end{aligned}$$

has a unique solution except when $\beta = 0$ and $\beta = 6$. If $\beta = 0$ prove that there is only one value of α for which a solution exists, and find the general solution in this case.

Problem 7

Let A and B be $n \times n$ matrices such that $(AB - I_n)$ is invertible. Show that

$$(BA - I_n)[B(AB - I_n)^{-1}A - I_n] = I_n$$

and deduce that $BA - I_n$ is also invertible.

"In our class we don't do easy.
We make easy happen through hard work and learning."
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