C2-001_Practice 04

Date	@2022년 8월 22일 오전 9:30
Lecture Note	C2-001_Lecture_04_matrix inverse.pdf
Practice (pdf)	C2-001_Practice_04.pdf
Solution (pdf)	C2-001_Practice_04-Sol.pdf
Topics	Lecture 04: Matrix Inversion
Week	4

- Please mark what you think is the correct answer (O or X) and show why you choose it.
  1. If a function, f, is invertible, then the inverse of f, f^{-1}, is unique.

  2. The following function in Fig. 1 is surjective.

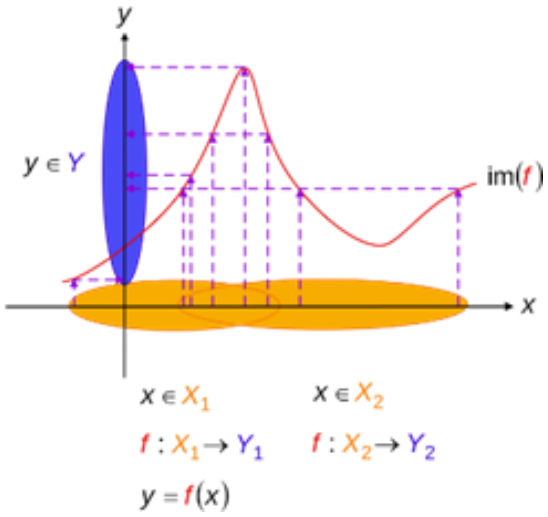

Fig. 1.
A function in the Cartesian plane defined by the mapping *f*: $X \to Y$ where *X* is a domain of function (yellow region) and *Y* is a range of function (blue region). Every element in the range is mapped onto from an element in the domain by function *f*.

  3. The following function in Fig. 2 is injective.

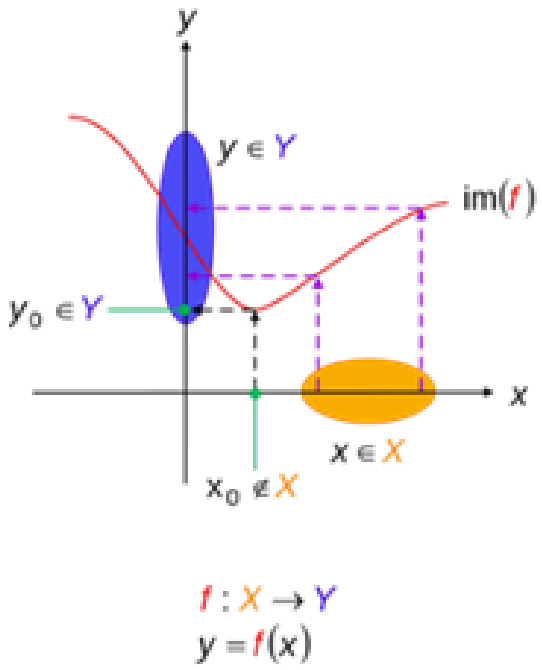

Fig. 2.

A function in the Cartesian plane defined by the mapping *f*: *X* → *Y* where *X* is a domain of function (yellow region) and *Y* is a range of function (blue region). Every element in the range is mapped onto from an element in the domain by function *f*.

4. A given matrix $\mathbf{A}\begin{bmatrix}1 & -1 & 1\\ -1 & 2 & 1\\ -1 & 3 & 4\end{bmatrix}$ is invertible because its determinant, $det(\mathbf{A})$, is 8.

5. Inverse matrix of $\mathbf{A} = \begin{bmatrix}1 & -1 & 1\\ -1 & 2 & 1\\ -1 & 3 & 4\end{bmatrix}$ is $\mathbf{A}^{-1}\begin{bmatrix}5 & 7 & -3\\ 3 & 5 & -2\\ -1 & 2 & 1\end{bmatrix}$.

6. Determinant of given matrix $\mathbf{A'} = \begin{bmatrix}-2 & 2 & -2\\ -1 & 2 & 1\\ -1 & 3 & 4\end{bmatrix}$, $det(\mathbf{A'})$, is -24.

7. Given two matrices, $\mathbf{A} = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $\mathbf{B} = \begin{bmatrix} 3 & 4 \\ 5 & 6 \end{bmatrix}$, $det(\mathbf{A} + \mathbf{B})$ is equal to $det(\mathbf{A}) + det(\mathbf{B})$.

8. If there are duplicate rows in the matrix $\mathbf{A}$, matrix $\mathbf{A}$ is not invertible.

9. A square matrix $\mathbf{A}_{n \times n}$ is always invertible.

10. Inverse matrix is always square matrix.