REPETITION 22/09

$$\boxed{A\vec{x} = \vec{b}}$$

If A is <u>invertible</u> $\Rightarrow$ $\vec{x} = A^{-1}\vec{b}$

<u>The inverse A^{-1}:</u>

If $A = \begin{pmatrix} a & b \\ c & d \end{pmatrix} \Rightarrow A^{-1} = \frac{1}{ad-bc}\begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$

$ad-bc \rightarrow \det(A)$ <u>determinant</u>

<u>Notice</u> : A is invertible $\Leftrightarrow$ $\det(A) \neq 0$

<u>Theorem 3.8</u> The following is equivalent for an $n \times n$ matrix

a/ A is invertible

b/ A has n pivot positions

c/ The equation $A\vec{x} = \vec{0}$ has only the trivial solution

d/ The columns of A form a Lin. independent set

e/ The Lin. transformation $T(\vec{x}) = A\vec{x}$ is one-to-one

f/ The equation $A\vec{x} = \vec{b}$ has exactly one solution for each $\vec{b} \in \mathbb{R}^n$

g/ The columns of A span $\mathbb{R}^n$

h/ The Lin. transformation $T(\vec{x}) = A\vec{x}$ is onto

i/ A^T is invertible