

2. Let M, N be $n \times n$ matrices over \mathbb{R} .
 (a) M is invertible $\iff \det(M) \neq 0$.
 (b) M is invertible $\iff \det(M) \neq 0$.
 (c) M is invertible $\iff \det(M) \neq 0$.
 (d) M is invertible $\iff \det(M) \neq 0$.
 (e) M is invertible $\iff \det(M) \neq 0$.
 (f) M is invertible $\iff \det(M) \neq 0$.
 (g) M is invertible $\iff \det(M) \neq 0$.
 (h) M is invertible $\iff \det(M) \neq 0$.
 (i) M is invertible $\iff \det(M) \neq 0$.
 (j) M is invertible $\iff \det(M) \neq 0$.
 (k) M is invertible $\iff \det(M) \neq 0$.
 (l) M is invertible $\iff \det(M) \neq 0$.
 (m) M is invertible $\iff \det(M) \neq 0$.
 (n) M is invertible $\iff \det(M) \neq 0$.
 (o) M is invertible $\iff \det(M) \neq 0$.
 (p) M is invertible $\iff \det(M) \neq 0$.
 (q) M is invertible $\iff \det(M) \neq 0$.
 (r) M is invertible $\iff \det(M) \neq 0$.
 (s) M is invertible $\iff \det(M) \neq 0$.
 (t) M is invertible $\iff \det(M) \neq 0$.
 (u) M is invertible $\iff \det(M) \neq 0$.
 (v) M is invertible $\iff \det(M) \neq 0$.
 (w) M is invertible $\iff \det(M) \neq 0$.
 (x) M is invertible $\iff \det(M) \neq 0$.
 (y) M is invertible $\iff \det(M) \neq 0$.
 (z) M is invertible $\iff \det(M) \neq 0$.

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1  Example
2   $x = \{1, 2, 3, 4\} = (x, y)$ 
3   $(x, y) = (x, y)$ 
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100  $(x, y) = (x, y)$ 

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3. $\mathcal{L}(\mathbf{A}^T \mathbf{A}) = \mathcal{L}(\mathbf{A})$, für $\mathbf{A} \in \mathbb{R}^{n \times m}$,
 4. $\mathcal{N}(\mathbf{A}) = \mathcal{L}(\mathbf{A}^T \mathbf{A})^\perp$,
 5. $\mathcal{L}(\mathbf{A} \mathbf{A}^T) = \mathcal{L}(\mathbf{A})$,
 6. $\mathcal{N}(\mathbf{A} \mathbf{A}^T) = \mathcal{L}(\mathbf{A}^T \mathbf{A})^\perp$,
 7. $\mathcal{L}(\mathbf{A} \mathbf{A}^T) = \mathcal{L}(\mathbf{A}^T \mathbf{A})$,
 8. $\mathcal{N}(\mathbf{A} \mathbf{A}^T) = \mathcal{N}(\mathbf{A}^T \mathbf{A})$,
 9. $\mathcal{L}(\mathbf{A} \mathbf{A}^T) = \mathcal{L}(\mathbf{A}^T \mathbf{A})$,
 10. $\mathcal{N}(\mathbf{A} \mathbf{A}^T) = \mathcal{N}(\mathbf{A}^T \mathbf{A})$.

[illegible][illegible][illegible]

Conclusion: Physics, when it goes into one that starts
in at **kinetics** but if it is enough!