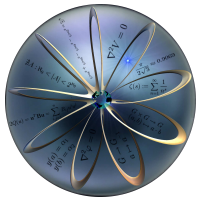

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has a rank

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Let R be a Noetherian ring with total quotient ring $\mathrm{Quot}(R)$, and M a finitely generated R-module. We say M has a rank if $M \otimes_R \mathrm{Quot}(R) \cong \mathrm{Quot}(R)^n$ for some non-negative integer n. And in this situation, we say M has rank n.