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radical

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Let F be a field and α be <http://planetmath.org/Algebraicalgebraic> over F . Then α is a *radical* over F if there exists a positive integer n with $\alpha^n \in F$.

Note that, if K/F is a field extension and α is a radical over F , then α is automatically a radical over K .

Following are some examples of radicals:

1. All numbers of the form $\sqrt[n]{\frac{a}{b}}$, where n is a positive integer and a and b are integers with $b \neq 0$ are radicals over \mathbb{Q} .
2. The number $\sqrt[4]{2}$ is a radical over $\mathbb{Q}(\sqrt{2})$ since $(\sqrt[4]{2})^2 = \sqrt{2} \in \mathbb{Q}(\sqrt{2})$.