casus irreducibilis

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Related topic	TakingSquareRootAlgebraically
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Let the polynomial

$$P(x) := x^n + a_1x^{n-1} + \ldots + a_n$$

with complex coefficients a_j be http://planetmath.org/IrreduciblePolynomial2irreducible, i.e. irreducible in the field $\mathbb{Q}(a_1, \ldots, a_n)$ of its coefficients. If the equation $P(x) = 0$ can be http://planetmath.org/AlgebraicallySolvablesolved algebraically and if all of its roots are real, then no root may be expressed with the numbers a_j using mere real http://planetmath.org/NthRootradicals unless the http://planetmath.org/AlgebraicEquationdegree n of the equation is an http://planetmath.org/GeneralAssociativityinteger power of 2.

References

[1] K. Väisälä: *Lukuteorian ja korkeamman algebran alkeet.* Tiedekirjasto No. 17. Kustannusosakeyhtiö Otava, Helsinki (1950).