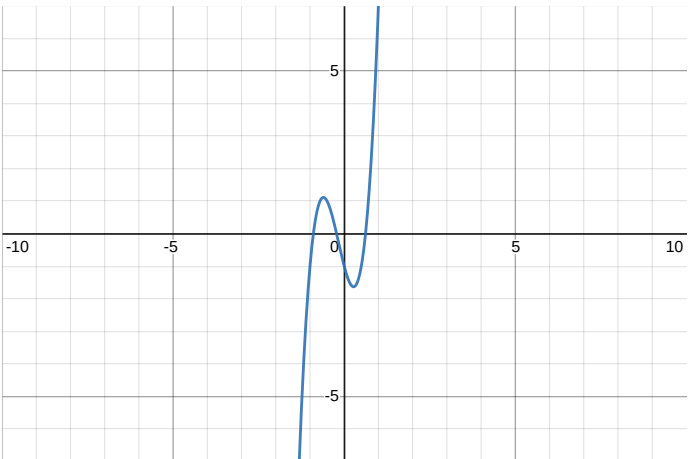


Info

This note, that [was found here](#), as a part of [a collection](#) is written (completely with human hands) by [Rupadarshi Ray](#), was created on May 16, 2024 6:38:10 PM, was last modified on September 2, 2026 2:37:49 PM, and was exported on September 7, 2026 2:50:35 PM.

$8X^3 + 4X^2 - 4X - 1$

in  $\mathbb{Q} \leq \mathbb{R} \leq \mathbb{C}$



There are no rational roots of the polynomial

$V_{\mathbb{Q}}(p(X)) = \emptyset$

because

**Proposition:** For  $p(X) := 8X^3 + 4X^2 - 4X - 1$  the real roots are

$Z(p)(\mathbb{R}) = \left\{ \cos\left(\frac{2\pi}{7}\right), \cos\left(\frac{4\pi}{7}\right), \cos\left(\frac{6\pi}{7}\right) \right\}$

so all are roots are irrational!

Now,

$\mathbb{Q} \leq \frac{\mathbb{Q}[X]}{(p(X))} = \mathbb{Q}\left(\cos\left(\frac{2\pi}{7}\right)\right) \leq \mathbb{R}$

Current note has 0 direct children and 0 total descendants.

- [squishy](#)
  - [Polynomials](#)
    - $8X^3 + 4X^2 - 4X - 1$

And it has 17 siblings.

- [squishy](#)
  - [Polynomials](#)
    - $X^n + Y^n = Z^n$
    - $8X^3 + 4X^2 - 4X - 1$
    - $x^2 + y^2 - 3$
    - [Folium of Descartes](#)

$X^3 + Y^3 - 3aXY$
    - $X^3 + Y^3 - a$
    - $3X^3 + 10X^2 + 3 - Y^2$
    - $3X^8 + 10X^4 + 3 - Y^2$
    - $XYZ - 1$
    - [Pythagorean triples](#)
    - [Bolza curve](#)
    - [Irreducible polynomials in  \$\mathbb{C}\[x, y\]\$](#)
    - [Polynomial maps  \$\mathbb{C}^n \rightarrow \mathbb{C}^n\$  of degree at most  \$d\$](#)
    - [Chebyshev polynomials of the first kind](#)
    - [Logistic map](#)
    - [Dynamics of the map  \$z^2 + c\$](#)
    - $\begin{pmatrix} x \\ y \\ y \end{pmatrix} \mapsto \begin{pmatrix} (1 + xy)^3 z + y^2(1 + xy)(4 + 3xy) \\ y + 3x(1 + xy)^2 z + 3xy^2(4 + 3xy) \\ 2x - 3x^2 y - x^3 z \end{pmatrix}$
    - $(w^2 - 1)^2$