

A NEW GENERAL QUARTIC EQUATION FORMULA

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Abstract: I present a new formula for solving general quartic equation.

FORMULA

After converting the general quartic equation (i.e. $ax^4+bx^3+cx^2+dx+e=0$) to its depressed form (i.e. $y^4+py^2+qy+r=0$), we have the following solutions to y :

$$y_1 = \frac{q}{8k} + \sqrt{-2k - \left(\frac{p}{2} + \frac{q^2}{64k^2}\right)}$$

$$y_2 = \frac{q}{8k} - \sqrt{-2k - \left(\frac{p}{2} + \frac{q^2}{64k^2}\right)}$$

$$y_3 = -\frac{q}{8k} + \sqrt{2k - \left(\frac{p}{2} + \frac{q^2}{64k^2}\right)}$$

$$y_4 = -\frac{q}{8k} - \sqrt{2k - \left(\frac{p}{2} + \frac{q^2}{64k^2}\right)}$$

Where k is one of the solutions to the equation:

$$4096k^6 - 256(p^2 - 4r)k^4 - 32pq^2k^2 - q^4 = 0$$