

Personal Skills 1

Polynomial equations the form $x^n + c = 0$ when $n \in \mathbb{I}^+$ and $n \geq 1$

Learning outcomes Find the n root of a complex number when $n \in \mathbb{I}^+$, and Solve polynomial equations of one variable with integer coefficients of degree less than or equal to three.

Intended destination Solve Polynomial equations of one variable in the form $x^n + c = 0$ the coefficients are integers.



Name Class.No.....
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Find answers to the following equation.

Sample $x^2 + 4 = 0$

Solution 1 $x^2 = -4 = 4(\cos 180^\circ + i \sin 180^\circ)$

or Solution 2 $x^2 + 4 = 0$

$$x^2 = -4 \quad x = \sqrt[4]{\cos \frac{180 + 360^\circ k}{2} + i \sin \frac{180 + 360^\circ k}{2}}$$


$$= 2(\cos 90^\circ + 180^\circ k + i \sin 90^\circ + 180^\circ k) \quad \text{when } k=0, 1$$

$$x_0 = 2(\cos 90^\circ + i \sin 90^\circ) = 2i$$

$$x_1 = 2(\cos 270^\circ + i \sin 270^\circ) = -2i$$

$$x = \pm \sqrt{-4}$$

$$x = \pm 2i$$

<p>1. $x^3 + 27i = 0$</p> <p><u>Solution</u></p>	<p>3. $x^3 - 64i = 0$</p> <p><u>Solution</u></p>
<p>2. $x^2 - \left(\frac{1}{\sqrt{2}} - \frac{1}{\sqrt{2}}i\right) = 0$</p> <p><u>Solution</u></p>	<div style="text-align: center;">  </div>

Summary score

Score 8 points made points

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