

April 13, 2016

$$f(x) = x^8 - 16$$

$$(x^4 - 4)(x^4 + 4)$$

$$(x^2 - 2)(x^2 + 2)(x^4 + 4)$$

$$x^2 - 2 = 0$$

$$x^2 = 2$$

$$x = \pm\sqrt{2}$$

$$x^2 + 2 = 0$$

$$x^2 = -2$$

$$x = \pm i\sqrt{2}$$

$$x^4 + 4 = 0$$

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

$$x^4 + 4 = (x^2 + 2i)(x^2 - 2i)$$

$$-4i^2 = 4$$

$$-4(-1) = 4$$

$$x^2 + 2i = 0$$

$$x^2 = -2i$$

$$x = \pm i\sqrt{2}$$

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$$f(x) = x^3 - 2x + 4$$

① Rational Zeros: $\pm 1, \pm 2, \pm 4$

-2	1	0	-2	4
	-2	4	-4	
	1	-2	2	0

← Remainder

$$P(x) = (x+2)(x^2 - 2x + 2) + 0$$

$$x^3 - 2x + 4 = (x+2)(x^2 - 2x + 2) + 0$$

$$x = 1 \pm i$$

Zeros: $-2, 1+i, 1-i$

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$$x^2 - 2x + 2$$

$$(x-2)(x-1)$$

$$\begin{array}{r} -x \\ -2x \\ \hline -3x \end{array}$$

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