

Watch. Practice. Understand. | Lesson 094

Finding Complex Zero with Factoring, p/q, Synthetic Division and Quadratic Formula

Watch the matching video: <https://www.youtube.com/watch?v=vzXq4WoSwnE>

Practice focus: Polynomial zeros and division

Original extra practice matched to the listed lesson topic.

Name: _____ Date: _____ Show your reasoning and check units.

01 Find all zeros of $x^3 - 2x^2 + 4x - 8$.

02 Divide $x^3 - 6x^2 + 11x - 6$ by $x - 1$.

03 Find the remainder when $2x^3 - x + 5$ is divided by $x - 2$.

04 A real-coefficient polynomial has zeros 1 and $2i$. Find a monic cubic with these zeros.

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Practice focus: Factoring polynomials

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Name: _____ Date: _____ Show your reasoning and check units.

05 Factor $6x^2 + 11x + 3$.

06 Factor $x^3 - 27$.

07 Factor $2x^3 - 8x$ completely over the real numbers.

08 Factor $x^4 - 5x^2 + 4$.

Worked answers | Lesson 094

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01 Find all zeros of $x^3 - 2x^2 + 4x - 8$.

Group: $(x - 2)(x^2 + 4)$. Zeros: 2, 2i, -2i.

02 Divide $x^3 - 6x^2 + 11x - 6$ by $x - 1$.

Synthetic division gives $x^2 - 5x + 6$ with remainder 0.

03 Find the remainder when $2x^3 - x + 5$ is divided by $x - 2$.

Remainder theorem: $f(2) = 16 - 2 + 5 = 19$.

04 A real-coefficient polynomial has zeros 1 and 2i. Find a monic cubic with these zeros.

-2i must also be a zero. $(x - 1)(x^2 + 4) = x^3 - x^2 + 4x - 4$.

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05 Factor $6x^2 + 11x + 3$.

Split $11x$ into $9x + 2x$; grouping gives $(3x + 1)(2x + 3)$.

06 Factor $x^3 - 27$.

Difference of cubes: $(x - 3)(x^2 + 3x + 9)$.

07 Factor $2x^3 - 8x$ completely over the real numbers.

Take out $2x$: $2x(x^2 - 4) = 2x(x - 2)(x + 2)$.

08 Factor $x^4 - 5x^2 + 4$.

Use $u = x^2$: $(u - 1)(u - 4)$. Result: $(x - 1)(x + 1)(x - 2)(x + 2)$.