

Complex Zeros of Polynomial Functions Worksheet

Conjugate Root Theorem | Algebra 2 & AP Precalculus

LEVEL 1 - Conjugates & Degree

Use the conjugate-root theorem. Count multiplicity when finding the least possible degree.

1

A polynomial has real coefficients and $3 + 4i$ is a zero. What other zero must occur?

2

A polynomial has real coefficients and $-2 - 5i$ is a zero. What other zero must occur?

3

A polynomial has real coefficients and $6i$ is a zero. What other zero must occur?

4

Known zeros are 2 and $-1 + 3i$. Complete the zero set and state the least possible degree.

5

Known zeros are -4 (multiplicity 2) and $2 + i$. Complete the zero set and state the least possible degree.

6

Known zeros are $1 + 2i$ (multiplicity 2) and -3 . Complete the zero set and state the least possible degree.

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LEVEL 2 - Build the Polynomial

Assume real coefficients. Add any missing conjugate, build factors, and expand to standard form.

7

Write the least-degree monic polynomial with real coefficients and zeros 2, -3, and $1 + 2i$. Give standard form.

8

Write the least-degree monic polynomial with real coefficients and zeros -1 and $4 + i$. Give standard form.

9

Write the least-degree monic polynomial with real coefficients and zeros 0 and $-2 + 3i$. Give standard form.

10

Write the least-degree monic polynomial with real coefficients and zeros 3 (multiplicity 2) and $-1 + 2i$. Give standard form.

11

Write the least-degree monic polynomial with real coefficients and zeros -2 and $1 + i$. Give standard form.

12

Write the least-degree monic polynomial with real coefficients and zeros 5 and $2i$. Give standard form.

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LEVEL 3 - Find All Zeros / Challenge

Use the given complex zero and its conjugate, then factor the remaining polynomial. Show exact answers.

13

Find all zeros of $x^3 - 2x^2 + 9x - 18$, given that $3i$ is a zero.

14

Find all zeros of $x^3 + x^2 - x + 15$, given that $1 + 2i$ is a zero.

15

Find all zeros of $x^4 + 2x^3 - 7x^2 + 2x - 8$, given that i is a zero.

16

Find all zeros of $x^4 + 2x^3 - 2x^2 - 6x + 5$, given that $-2 + i$ is a zero.

17

Find all zeros of $x^5 - 7x^4 + 21x^3 - 23x^2 - 52x$, given that $2 + 3i$ is a zero.

18

A real-coefficient polynomial has zeros -2 , 1 (multiplicity 2), and $3 + 2i$, with leading coefficient 2. Write it in standard form.
