

Name : _____

Score : _____

Teacher : _____

Date : _____

Irrational and Imaginary Root Theorems

Find the number of complex roots, and the possible number of real and imaginary roots.

1) $f(x) = x^2 + 6x + 4$

2) $f(x) = x^6 - 4x^5 - 3x^4 + 12x^3 + 12x^2 + 16x + 16$

3) $f(x) = x^6 - 2x^5 + 16x^4 - 34x^3 - x^2 - 32x - 16$

4) $f(x) = x^3 + 3x^2 + 5x + 15$

A polynomial function with rational coefficients has the following zeros. Find the additional zeros.

5) $2 + i, \sqrt{2}$

6) $-3 - \sqrt{2}, 5i$

7) $\sqrt{5}, -\sqrt{3}, -\sqrt{5}, 1, 4$

8) $\sqrt{2}i, 1$

Write a polynomial function of the least degree with integer coefficients that has the given roots.

9) $3, -1 + \sqrt{3}, -5i$

10) $-3 - \sqrt{2}, 4$

11) $i, -2 + \sqrt{3}$

12) $\sqrt{5}i, 1, 2i$



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Irrational and Imaginary Root Theorems

Find the number of complex roots, and the possible number of real and imaginary roots.

1) $f(x) = x^2 + 6x + 4$

of Complex zeros: 2

Possible Real Zeros: 2 or 0

Possible Imaginary Zeros: 2 or 0

2) $f(x) = x^6 - 4x^5 - 3x^4 + 12x^3 + 12x^2 + 16x + 16$

of Complex zeros: 6

Possible Real Zeros: 6, 4, 2, or 0

Possible Imaginary Zeros: 6, 4, 2, or 0

3) $f(x) = x^6 - 2x^5 + 16x^4 - 34x^3 - x^2 - 32x - 16$

of Complex zeros: 6

Possible Real Zeros: 6, 4, 2, or 0

Possible Imaginary Zeros: 6, 4, 2, or 0

4) $f(x) = x^3 + 3x^2 + 5x + 15$

of Complex zeros: 3

Possible Real Zeros: 3 or 1

Possible Imaginary Zeros: 2 or 0

A polynomial function with rat'l coefficients has the following zeros. Find the additional zeros.

5) $2 + i, \sqrt{2}$
 $2 - i, -\sqrt{2}$

6) $-3 - \sqrt{2}, 5i$
 $-3 + \sqrt{2}, -5i$

7) $\sqrt{5}, -\sqrt{3}, -\sqrt{5}, 1, 4$
 $\sqrt{3}$

8) $\sqrt{2}i, 1$
 $-\sqrt{2}i$

Write a polynomial function of the least degree with integer coefficients that has the given roots.

9) $3, -1 + \sqrt{3}, -5i$
 $x^5 - x^4 + 17x^3 - 19x^2 - 200x + 150$

10) $-3 - \sqrt{2}, 4$
 $x^3 + 2x^2 - 17x - 28$

11) $i, -2 + \sqrt{3}$
 $x^4 + 4x^3 + 2x^2 + 4x + 1$

12) $\sqrt{5}i, 1, 2i$
 $x^5 - x^4 + 9x^3 - 9x^2 + 20x - 20$

