 Name_____

Polynomials and Conjugate Roots

Date_____ Period____

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

1) $-1,\ \ 1 + 3i$

2) $-\frac{1}{4},\ \ 1 + \sqrt{6}$

3) -3 mult. 2, $\ \ 2\sqrt{2}$

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

5) $1 - i,\ \ \sqrt{7}$

6) $-3 + 2i,\ \ -2 - 2i,\ \ -2 + 2i$

Write a polynomial function of least degree with integral coefficients that has the given zeros.

7) $-\frac{1}{2},\ \ 1,\ \ \frac{3}{4}$

8) $-1,\ \ -i$

9) 2 mult. 3

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

11) $-3,\ \ \sqrt{3}$

12) $1 + \sqrt{10}$ mult. 2, $\ \ 1 - \sqrt{10}$

13) $-i$ mult. 2

14) $\frac{4}{5},\ \ 2i$

Critical thinking questions:

15) Explain why it makes sense that a third-degree polynomial must have at least one rational zero.

16) Write a polynomial function of degree ten that has two imaginary roots.

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

1) $-1,\ 1+3i$

$1-3i$

2) $-\frac{1}{4},\ 1+\sqrt{6}$

$1-\sqrt{6}$

3) -3 mult. 2, $2\sqrt{2}$

$-2\sqrt{2}$

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

$1-\sqrt{3},\ -3-\sqrt{5}$

5) $1-i,\ \sqrt{7}$

$1+i,\ -\sqrt{7}$

6) $-3+2i,\ -2-2i,\ -2+2i$

$-3-2i$

Write a polynomial function of least degree with integral coefficients that has the given zeros.

7) $-\frac{1}{2},\ 1,\ \frac{3}{4}$

$f(x)=8x^3-10x^2-x+3$

8) $-1,\ -i$

$f(x)=x^3+x^2+x+1$

9) 2 mult. 3

$f(x)=x^3-6x^2+12x-8$

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

$f(x)=x^3+3x^2-8x-24$

11) $-3,\ \sqrt{3}$

$f(x)=x^3+3x^2-3x-9$

12) $1+\sqrt{10}$ mult. 2, $1-\sqrt{10}$

$f(x)=x^4-4x^3-14x^2+36x+81$

13) $-i$ mult. 2

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

14) $\frac{4}{5},\ 2i$

$f(x)=5x^3-4x^2+20x-16$

Critical thinking questions:

15) Explain why it makes sense that a third-degree polynomial must have at least one rational zero.

It must go from ∞ to $-\infty$ so it must cross the x-axis.

16) Write a polynomial function of degree ten that has two imaginary roots.

$f(x)=(x^2+1)^5$