

Writing Polynomials When Given the Roots



Tips: (square root)

1. radical and complex number (imaginary) always come in pairs! \pm

Examples:

$$\sqrt{2} \rightarrow -\sqrt{2}$$

$a+bi$

$$7i \rightarrow -7i$$

$$5+2i \rightarrow 5-2i$$

conjugate term

Practice: The given number is a zero of a polynomial, what is the other zero? *Just change signs on radical and imaginary!*

A. $-\sqrt{10}$
 $\sqrt{10}$

D. $-8i$

B. $4-3i$
 $4+3i$

E. $\frac{-8+\sqrt{7}}{2}$, $\frac{-8-\sqrt{7}}{2}$

C. $2-\sqrt{5}$
 $2+\sqrt{5}$

Given the zeros, write the polynomial function with the least degree.

1) 5 and -3

$$x=5 \quad x=-3$$

$$x-5=0 \quad x+3=0$$

$$(x-5)(x+3)=0$$

| | |
|----------------|-----|
| x | x-5 |
| x ² | -5x |
| +3 | -15 |
| 3x | |

$$x^2 - 2x - 15 = y$$

Given the zeros, write the polynomial function with the least degree.

2) Zeros: 5, 4, $-\frac{1}{2}$
 $x = -\frac{1}{2}$
 $2x = -1$

$$(x-5)(x-4)(2x+1)$$

$$(x^2 - 4x - 5x + 20)(2x+1)$$

$$(x^2 - 9x + 20)(2x+1)$$

| | | | |
|------|--------|----------|-------|
| | x^2 | $-9x$ | 20 |
| $2x$ | $2x^3$ | $-18x^2$ | $40x$ |
| $+1$ | x^2 | $-9x$ | 20 |

$$f(x) = 2x^3 - 17x^2 + 31x + 20$$

Writing Polynomials Given Zeros Review

Date _____

Period _____

Find all additional zeros given the following zeros:

1) $\frac{2}{3}, -1, -3-i$

$-3+i$

2) $-4, (-3+\sqrt{3})$
 $-3-\sqrt{3}$

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

$-i, 3-\sqrt{2}$

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

5) $\frac{5}{4}, \frac{1}{2}, \sqrt{7}, -\sqrt{7}$

6) $\frac{1}{5}, 0, i, -i$

7) $-3+\sqrt{3}, 1+\sqrt{2}, -3-\sqrt{3}, 1-\sqrt{2}$

8) $-3i, \sqrt{3}, 3i, -\sqrt{3}$

9) $-2, -1-i, -2+2i, -1+i, -2-2i$

10) $-3, 1+2i, 1-2i$

11) $-1, 4, -5$

12) $-5, 3i$

13) $-1, -3i$

14) $-2, 0, -5, 3$

15) $3, 2i$

16) $-3, 1, 5$

17) $5, 3i$

18) $4, -1, 3, 2$

19) 1 mult. 2, 4

20) $2, 3i$

21) $-$ $0, 2$

22) 4 mult. 2, 1