

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

2) Zeros: 5, 4, -1/2

$$x = -\frac{1}{2} \quad 2x = -1$$

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

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

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

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

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

3) 7 and $-\sqrt{2}$, $\sqrt{2}$

$$x = 7 \quad x - 7 = 0$$

$$(x - \sqrt{2})(x + \sqrt{2})(x - 7)$$

$$(x^2 + x\sqrt{2} - x\sqrt{2} - \sqrt{4})(x - 7)$$

$$(x^2 - 2)(x - 7)$$

	x^3	$-7x^2$	$-2x$	$+14$
$+1$	x^2	$-2x$	$+14$	

$$x^3 - 7x^2 - 2x + 14$$

* Multiply i's or $\sqrt{\quad}$ first

4. Zeros: -1, $7i$, $-7i$

$$(x + 7i)(x - 7i)(x + 1)$$

	x^2	$7xi$	
$-7i$	$-7xi$	$49i^2$	$\rightarrow 49(-1) \rightarrow 49$

$$(x^2 + 49)(x + 1)$$

$$x^2 + 49$$

	x^3	$49x$
$+1$	x^2	49

$$x^3 + x^2 + 49x + 49$$

Ex.

Zeros: $3, \sqrt{5}, -\sqrt{5}$

$$(x - \sqrt{5})(x + \sqrt{5})(x - 3)$$

$$(x^2 + x\sqrt{5} - x\sqrt{5} - \sqrt{5}\sqrt{5})(x - 3)$$

$$(x^2 - 5)(x - 3)$$

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

Zeros: $-2, -\sqrt{11}, \sqrt{11}$

$$(x + 2)(x + \sqrt{11})(x - \sqrt{11})$$

$$\sqrt{121} = 11$$

$$(x + 2)(x^2 - 11)$$

$$x^3 - 11x + 2x^2 - 22$$

$$x^3 + 2x^2 - 11x - 22$$

Writing Polynomials Given Zeros Review

Date _____ Period ____

Find all additional zeros given the following zeros:

1) $-1, 3 + \sqrt{10}, 3 + \sqrt{5}, 3 - \sqrt{5}$

$$3 - \sqrt{10}$$

2) $\frac{5}{3}, 2, -2 + \sqrt{7}$

$$-2 - \sqrt{7}$$

3) $\sqrt{10}, -1 - 2i$

$$-\sqrt{10}, -1 + 2i$$

4) $2, -3 + 3i$

$$2, -3 - 3i$$

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

5) $-2, -3i, 3i$

$$(x+3i)(x-3i)(x+2)$$

$$(x^2 - 3xi + 3xi - 9i^2)(x+2)$$

$$(x^2 + 9)(x+2)$$

$$f(x) = x^3 + 2x^2 + 9x + 18$$

6) $-3, 0, -5$

$$x(x+3)(x+5)$$

$$(x^2 + 3x)(x+5)$$

$$x^3 + 5x^2 + 3x^2 + 15x$$

$$f(x) = x^3 + 8x^2 + 15x$$

7) $0, i, -i$

$$x(x-i)(x+i)$$

$$x(x^2 + ix - ix - i^2)$$

$$x(x^2 + 1)$$

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

8) 5 mult. 2, -4

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

$$(x^2 - 5x - 5x + 25)(x+4)$$

$$(x^2 - 10x + 25)(x+4)$$

	x^2	$-10x$	25
x	x^3	$-10x^2$	$25x$
4	$4x^2$	$-40x$	100

$$f(x) = x^3 - 6x^2 - 15x + 100$$