

Chapter 5.1 Notes  
Polynomial Functions

1. Form a polynomial whose zeros and degree are given.

Zeros:  $-2, 2, 6$  degree 3 ← This # just tells you what your largest degree (exponent) of  $x$  will be in the final answer.

$(x+2)(x-2)(x-6)$  • write down opposites

$(x+2)(x-2)$

$x^2 - 2x + 2x - 4$

$(x^2 - 4)(x-6)$

$x^3 - 6x^2 - 4x + 24$

- \* whatever the degree is, make that many sets of (). Here ours was 3, so  $( ) ( ) ( )$ .
- \* Then place an  $x$  in each set of  $( )$ .
- \* Then take the zeros, and write down the opposite in each set of  $( )$ .
- \* Now take 2 of the sets of  $( )$  and multiply them together.
- \* Then combine like terms.
- \* Now multiply that by the third set of  $( )$ .
- \* Combine any like terms if able

2. Form a polynomial whose zeros and degree are given.

Zeros:  $-4, 0, 1$  degree: 3

$(x+4)(x+0)(x-1)$  take opposites

$(x+4)(x+0)$

$x^2 + 0x + 4x + 0$

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

$x^3 - x^2 + 4x^2 - 4x$

$x^3 + 3x^2 - 4x$

- \* whatever the degree is, make that many sets of  $( )$ . Here ours was 3, so  $( ) ( ) ( )$ .
- \* Then place an  $x$  in each set of  $( )$ .
- \* Then take the zeros, and write down the opposite in each set of  $( )$ .
- \* Now take 2 of the sets of  $( )$  and multiply them together.
- \* Then combine like terms.
- \* Now multiply that by the third set of  $( )$ .
- \* Combine any like terms if able

3. Form a polynomial whose zeros and degree are given.

zeros: 8, multiplicity 1 ; multiplicity 2 ; degree 3

$$(x-8)(x-2)(x-2)$$

$$(x-2)(x-2)$$

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

$$(x-8)(x^2 - 4x + 4)$$

$$x^3 - 4x^2 + 4x - 8x^2 + 32x - 32$$

$$x^3 - 12x^2 + 36x - 32$$

↑  
since there is a multiplicity of 2, you just write that # down twice.

- \* whatever the degree is, make that many sets of (). Her ours was 3, so () () ().
- \* Then place an x in each set of ().
- \* Then take the zeros, and write down the opposite in each set of (). Since one of the numbers has a multiplicity of 2, you will write that number down twice.
- \* Now take 2 of the sets of () and multiply them together.
- \* Then combine like terms.
- \* Now multiply that by the third set of ().
- \* Combine any like terms if able

4. Form a polynomial whose zeros and degree are given.

zeros: -5, -2, 4, 5 degree: 4

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

$$(x+5)(x+2)$$

$$x^2 + 2x + 5x + 10$$

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

$$x^2 - 5x - 4x + 20$$

$$(x^2 + 7x + 10)(x^2 - 9x + 20)$$

$$x^4 - 9x^3 + 20x^2 + 7x^3 - 63x^2 + 140x + 10x^2 - 90x + 200$$

$$x^4 - 2x^3 - 33x^2 + 50x + 200$$

- \* whatever the degree is, make that many sets of (). Her ours was 3, so () () ().
- \* Then place an x in each set of ().
- \* Then take the zeros, and write down the opposite in each set of (). Since one of the numbers has a multiplicity of 2, you will write that number down twice.
- \* Now take 2 of the sets of () and multiply them together.
- \* Then combine like terms.
- \* Now multiply that by the third set of ().
- \* Combine any like terms if able.
- \* Then multiply that by the 4th set of ().
- \* Then combine any like terms.