

Lesson 15  
4.1  
10.20.15  
Polynomial Functions

The **degree** of a polynomial in one variable is the greatest exponent of its variable.

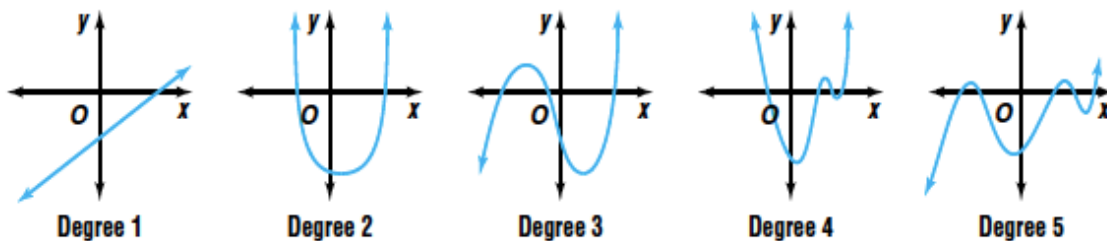
The **leading coefficient** is the coefficient of the variable with the greatest variable.

**Zeros** of the function are the points when  $f(x) = 0$ .

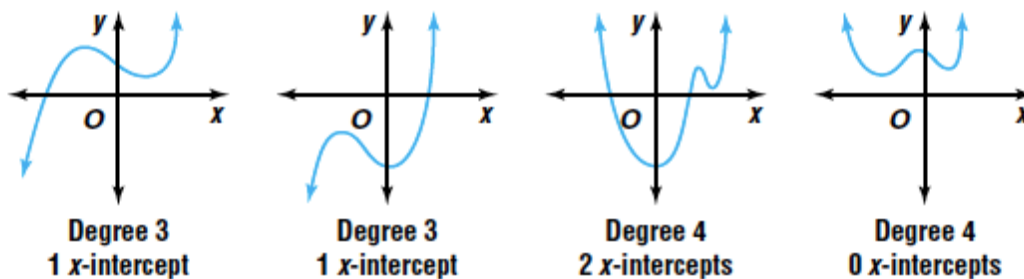
**Imaginary numbers** are roots with the imaginary unit  $i$ .

A **Complex Number** is a number in the form of  $a+bi$ .

**The Fundamental Theorem of Algebra** :For every polynomial equation with degree greater than zero has at least one root in the set of complex numbers.



degree= bumps+1



I do:

Write a polynomial equation of least degree with roots, 2, 4i and -4i.

Identify roots.	
Set as factors.	
Foil	
Simplify	

We Try:

Write a polynomial equation of least degree with roots, 2, -3,4

Identify roots.	
Set as factors.	
Foil	
Simplify	

We Try:

Write a polynomial equation of least degree with roots, -2, -i and i.

Identify roots.	
Set as factors.	
Foil	
Simplify	

You Try with your partner in your notebook:

Write a polynomial equation of least degree with roots, 0, 2i and -2i.

Identify roots.	
Set as factors.	
Foil	
Simplify	

I Try:

Sketch a 5<sup>th</sup> degree equation for each of the situations.

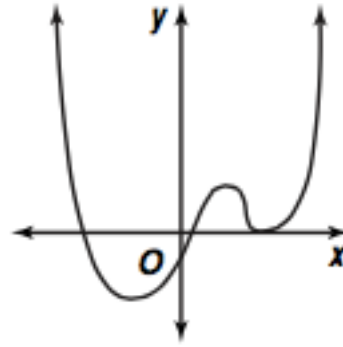
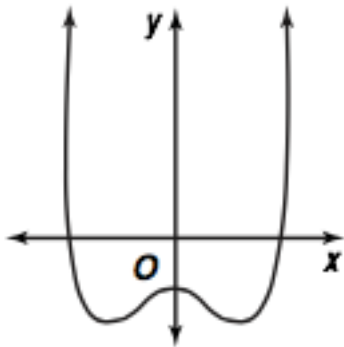
- No x-intercept
- 2 x-intercepts
- 3 x-intercepts
- 5 x-intercepts

We Try:

Sketch a 6<sup>th</sup> degree equation for each of the situations.

- No x-intercept
- 2 x-intercepts
- 3 x-intercepts
- 5 x-intercepts

State the number of complex zeros and the number of real zeros of each function.



Determine the Degree	
How many real roots are there? (x-intercepts)	
How many imaginary are there?	

We Try:

Determine the Degree	
How many real roots are there? (x-intercepts)	
How many imaginary are there?	