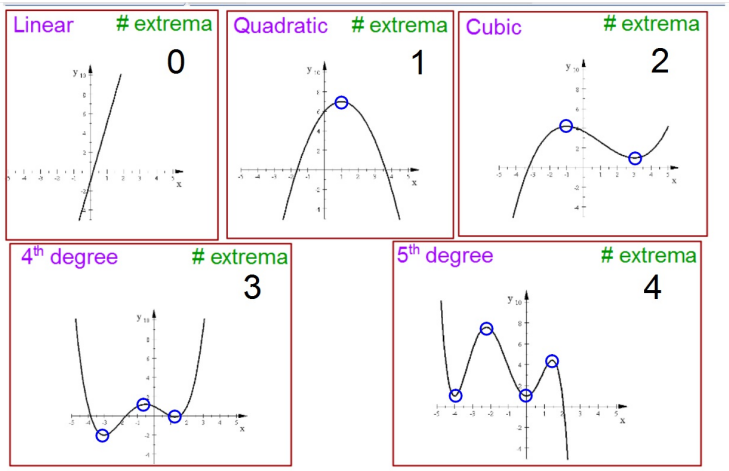
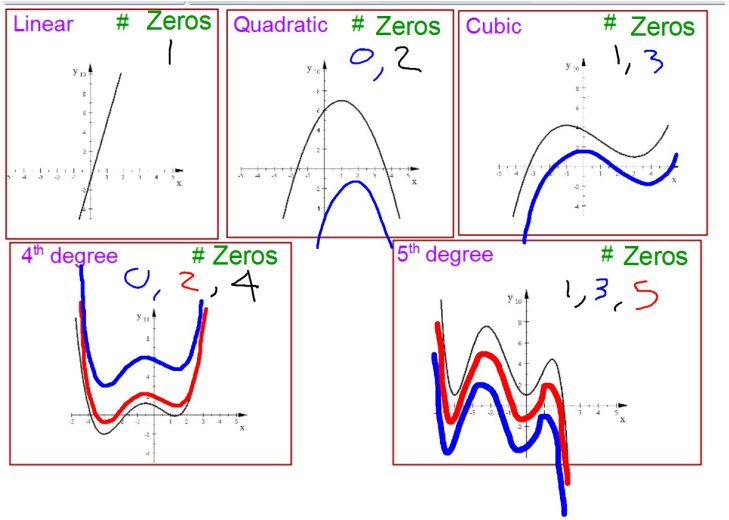


Number of extrema of a polynomial:

If the degree of the polynomial is n
then there can be up to n-1 extrema.



Polynomials

X - Intercepts -- Can have up to n x-intercepts.
n = degree of polynomial

EVEN Functions may have no x-intecept or multiple x-intercepts.
ODD Functions must have at least 1 x-intercept

x-intercepts is the same as the # of REAL zeros

ALL Functions

Y - intercepts -- All polynomials have at most 1 y-intercept.

X-intercepts of a graph are also.....

.....Solutions to the equation when y=0

Every polynomial has exactly n solutions, where n is the degree of the polynomial.

Some of these solutions may be imaginary so not all solutions can be found by graphing.

Sec 6-4: Solving Polynomial Equations

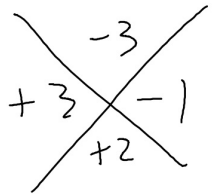
- Solve by factoring
- Solve by graphing

Solve by factoring (same question as if I asked you to find the zeros of the function!)

Find ALL Complex solutions.

$3x^7 + 6x^5 - 9x^3 = 0$

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



$3x^3(x^2 + 3)(x^2 - 1)$

$3x^3(x^2+3)(x\pm1)$

$x = 0, \pm i\sqrt{3}, \pm 1$

This is a triple zero, therefore, we've found all seven solutions.

Solve. $x^3 + 3x^2 - 4x - 12 = 0$

How would you factor a polynomial with four terms?

	x	$+3$
x^2	x^3	$+3x^2$
-4	$-4x$	-12

$(x+3)(x^2-4)=0$

$(x\pm2)$

$x = -3, \pm 2$

Find ALL Complex solutions.

$2x^3 - 3x^2 + 10x - 15 = 0$

	$2x$	-3
x^2	$2x^3$	$-3x^2$
$+5$	$+10x$	-15

$(2x-3)(x^2+5)=0$

$x = 3/2, \pm i\sqrt{5}$

Find ALL Complex solutions.

$2x^5 - 72x = 0$

$2x(x^4-36)=0$

$2x(x^2+6)(x^2-6)=0$

$x = 0, \pm i\sqrt{6}, \pm\sqrt{6}$

Find ALL Complex solutions.

$x^5 + 9x^3 - 36x = 0$

$x(x^4 + 9x^2 - 36) = 0$

$x(x^2 + 12)(x^2 - 3) = 0$

$x = 0, \pm 2i\sqrt{3}, \pm\sqrt{3}$