Review of Factoring

→ Quadratics

- put in order
- take out GCF
- check for diff of squares
- if x^2+bx+c use product-sum
- if ax^2+bx+c use decomposition

Ex: $2x-5+3x^2$

$3x^2+2x-5$

-15	
-1	15
-5	3
-3	5
-15	1

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

$3x(x-1)+5(x-1)$

$(3x+5)(x-1)$

Ex: x^2-5x+6 (A, M)

$(x-3)(x-2)$

	x	-1
$3x$	$3x^2$	$-3x$
$+5$	$+5x$	-5

Ex: $5x^2-20$

$5(x^2-4)$

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

Sometimes you can factor a quartic using quadratic techniques

Ex: x^4-10x^2+9

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

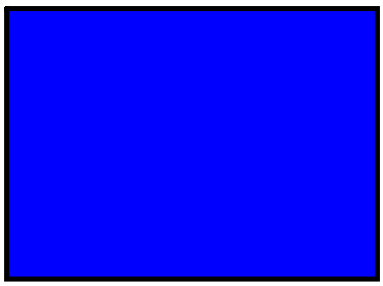
$(x+3)(x-3)(x+1)(x-1)$

Ex: x^4-81

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

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

Sometimes you can factor a cubic using a process of "grouping" similar to how you factor using decomposition.



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

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

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

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

Ex: $x^3 - 5x^2 - 3x + 15$

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

$x^2 - 3 = 0$

$x^2 = 3$

$x = \pm\sqrt{3}$

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

Difference of cubes: $x^3 - a^3$

Ex: $x^3 - 8$

$x^3 - 2^3$

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

Sum of cubes: $x^3 + a^3$

Ex: $x^3 + 27$

$x^3 + 3^3$

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

Ex: $8x^3 - 125$

$(2x-5)(4x^2+10x+25)$

Ex: $64 + 8x^3$

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