Factoring

1) Greatest Common Factor (pull out numbers and/or letters that all terms have in common)

Ex) $20x^3y - 8x^2y^3 + 4x^1$

$4x^1(5x^2y - 2xy^3 + 1)$

2) Trinomials

i) Simple Trinomial (has 1 infront of x^2)

Ex) $x^2 + 2x - 15$

Sign on largest is +

Signs different

what do I multiply to get last #? But add to get middle

x	+
-15	+2
-1×15	
-3×5 ✓	

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

ii) Hard Trinomials (Decomposition)

$6x^2 - 19x - 7$

largest factor

signs different on factors

infront of x^2 is not 1

→ Does not have 1 infront of x^2 (Does not have GCF.)

Step 1)
→ What 2 factor do I multiply to get $6 \times -7 = -42$
→ But add to get middle $= -19$

x	+
-42	-19
$+2 \times 21$	

Step 2) Break down middle terms into factors →

$6x^2 + 2x - 21x - 7$

factor out GCF in first 2 terms

Factor out GCF in last two terms

$2x(3x+1) - 7(3x+1)$

$(3x+1)(2x-7)$

3) Difference of Squares

Rule
$a^2 - b^2$
$(a-b)(a+b)$
these are $\sqrt{a^2} = a$

Ex) $9x^2 - 25$

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

4) Perfect Square Trinomials

$a^2 + 2ab + b^2$ or $a^2 - 2ab + b^2$

Ex) $x^2 + 10x + 25$

$2(5)x$ ✓

$\sqrt{x^2}$

sign

$\sqrt{25}$

$(x+5)^2$

Ex2) $4x^2 - 12x + 9$

perfect sq $(2x)^2$

$(3)^2$

$2(2x \cdot 3)$
$12x$ ✓

$(2x-3)^2$