

GCF	1. $12a^3 + 10a^2$ $2a^2(6a + 5)$	2. $14m^8n^5 - 7m^2n^2$ $7m^2n^2(2m^6n^3 - 1)$
	DIFFERENCE OF SQUARES Perfect Squares: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, ... Rule: $a^2 - b^2 = (a+b)(a-b)$	
$a^2 - b^2$	3. $9x^2 - 49y^2$ $(3x - 7y)(3x + 7y)$	4. $72c^4 - 2$ $2(36c^4 - 1)$ $2(6c^2 - 1)(6c^2 + 1)$
	5. $7m^7n - 28mn^3$ $7mn(m^6 - 4n^2)$ $7mn(m^3 - 2n)(m^3 + 2n)$	6. $10w^5 - 10w$ $10w(w^4 - 1)$ $10w(w^2 - 1)(w^2 + 1)$ $10w(w + 1)(w - 1)(w^2 + 1)$

SUM OF CUBES $a^3 + b^3$	Perfect Cubes: 1, 8, 27, 64, 125, 216, 343, 512, ... Rule: $a^3 + b^3 = (a+b)(a^2 - ab + b^2)$	
	7. $x^3 + 27 \rightarrow (x)^3 + (3)^3$ $(x + 3)(x^2 - 3x + 9)$	8. $m^3 + 216n^3 \rightarrow (m)^3 + (6n)^3$ $(m + 6n)(m^2 - 6mn + 36n^2)$
	9. $500a^3 + 4$ $4(125a^3 + 1) \rightarrow (5a)^3 + (1)^3$ $4(5a + 1)(25a^2 - 5a + 1)$	10. $24c^4d + 375cd^4$ $3cd(8c^3 + 125d^3) \rightarrow (2c)^3 + (5d)^3$ $3cd(2c + 5d)(4c^2 - 10cd + 25d^2)$

DIFFERENCE OF CUBES $a^3 - b^3$	Rule: $a^3 - b^3 = (a-b)(a^2 + ab + b^2)$	
	11. $x^3 - 1 \rightarrow (x)^3 - (1)^3$ $(x - 1)(x^2 + x + 1)$	12. $216k^3 - 125 \rightarrow (6k)^3 - (5)^3$ $(6k - 5)(36k^2 + 30k + 25)$
	13. $4 - 32h^3$ $4(1 - 8h^3) \rightarrow (1)^3 - (2h)^3$ $4(1 - 2h)(1 + 2h + 4h^2)$	14. $2x^3 - 54y^3$ $2(x^3 - 27y^3) \rightarrow (x)^3 - (3y)^3$ $2(x - 3y)(x^2 + 3xy + 9y^2)$

TRINOMIALS

15. $n^4 + 2n^2 - 24$

$(n^2 + 6)(n^2 - 4)$

$(n^2 + 6)(n + 2)(n - 2)$

16. $w^3 + w^2 - 20w$

$w(w^2 + w - 20)$

$w(w + 5)(w - 4)$

17. $2a^3 + 38a^2 + 68a$

$2a(a^2 + 19a + 34)$

$2a(a + 17)(a + 2)$

18. $x^5 - 24x^3 - 25x$

$x(x^4 - 24x^2 - 25)$

$x(x^2 - 25)(x^2 + 1)$

$x(x + 5)(x - 5)(x^2 + 1)$

19. $3x^4 + 14x^2 - 5$

$x^4 + 14x^2 - 15$

$(x^2 + \frac{15}{3})(x^2 - \frac{1}{3})$

$(x^2 + 5)(x^2 - 1)$

$(x^2 + 5)(x + 1)(x - 1)$

20. $9m^4 - 12m^2 + 4$

$(3m^2 + 2)(3m^2 - 2)$

FOUR TERMS

Rule: Use grouping!

Steps		Example
①	GROUP the first two terms together and the last two terms.	$x^3 + x^2 - 4x - 4$
②	FACTOR the GCF for each group.	$\underline{x^2}(x+1) - \underline{4}(x+1)$
③	FACTOR the common binomial.	$(x^2-4)(x+1)$ $(x+2)(x-2)(x+1)$
21.	$x^3 - x^2 + 9x - 9$ $\underline{x^2}(x-1) + \underline{9}(x-1)$ $(x^2+9)(x-1)$	22. $k^3 + 5k^2 - k - 5$ $\underline{k^2}(k+5) - \underline{1}(k+5)$ $(k^2-1)(k+5)$ $(k-1)(k+1)(k+5)$
23.	$4v^3 - 5v^2 - 16v + 20$ $\underline{v^2}(4v-5) - \underline{4}(4v-5)$ $(v^2-4)(4v-5)$ $(v-2)(v+2)(4v-5)$	24. $2x^5 - 18x^4 + 7x - 63$ $2x^4(x-9) + 7(x-9)$ $(2x^4 + 7)(x-9)$