Name: Key Algebra II Period: _____

Factoring Polynomials

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 $a^2 - b^2$

Perfect Squares: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144

Rule: $a^2 - b^2 = (a+b)(a-b)$

3.) $x^2 - 9$ $a=x$ $b=3$

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

4.) $x^2 - 49$ $a=x$ $b=7$

$(x+7)(x-7)$

5.) $3x^2 - 48$ $a=x$ $b=4$

$3(x^2-16)$

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

6.) $25x^2 - y^2$ $a=5x$ $b=y$

$(5x+y)(5x-y)$

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.) $x^3 + 27$ $a=x$ $b=3$

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

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

8.) $m^3 + 216$ $a=m$ $b=6$

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

$(m+6)(m^2 - 6m + 36)$

9.) $500a^3 + 4$ $a=5a$ $b=1$

$4(125a^3 + 1)$

$4(5a+1)((5a)^2 - (5a)(1) + (1)^2)$

$4(5a+1)(25a^2 - 5a + 1)$

10.) $8x^3 + 64y^3$ $a=x$ $b=2y$

$8(x^3 + 8y^3)$

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

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

Difference of Cubes $a^3 - b^3$

Rule: $a^3 - b^3 = (a-b)(a^2 + ab + b^2)$

11.) $x^3 - 1$ $a=x$ $b=1$

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

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

12.) $216k^3 - 125$ $a=6k$ $b=5$

$(6k-5)((6k)^2 + (6k)(5) + (5)^2)$

$(6k-5)(36k^2 + 30k + 25)$

13.) $4 - 32h^3$ $a=1$ $b=2h$

$4(1 - 8h^3)$

$4(1-2h)((1)^2 + (1)(2h) + (2h)^2)$

$4(1-2h)(1 + 2h + 4h^2)$

14.) $2x^3 - 54y^3$ $a=x$ $b=3y$

$2(x^3 - 27y^3)$

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

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

Name: _____ Algebra II Period: _____

Trinomials

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

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

-24: $6 \cdot -4$, 2

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

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

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

-20: $5 \cdot -4$, 1

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

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

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

34: $2 \cdot 17$, 19

18.) $x^4 - 24x^2 - 25$

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

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

-25: $-25 \cdot 1$, -24

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

$(3x^4+15x^2)(-x^2-5)$

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

$(3x^2+1)(x^2+5)$

-15: $15 \cdot -1$, 14

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

$(9m^4-6m^2)(-6m^2+4)$

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

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

36: $-6 \cdot -6$, -12

Four Terms

Rule: Use grouping!

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

$x^2(x+1)-4(x+1)$

$(x^2-4)(x+1)$

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

22.) $(x^3 - 2x^2)(+5x - 10)$

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

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

23.) $(k^3 + 5k^2)(-k - 5)$

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

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

$(k+1)(k-1)(k+5)$

24.) $(c^3 - c^2)(-9c + 9)$

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

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

$(c+3)(c-3)(c-1)$

25.) $(4v^3 - 5v^2)(-16v + 20)$

$v^2(4v-5)-4(4v-5)$

$(v^2-4)(4v-5)$

$(v+2)(v-2)(4v-5)$

26.) $(2x^3 - 18x^2)(+7x - 63)$

$2x^2(x-9)+7(x-9)$

$(2x^2+7)(x-9)$