PreCalculus 11 Date _____

Unit 3: Quadratic Equations
3.0 Factoring Review

To factor means to write as a product.

- **Reverse of multiplying**

GCF Factoring (*always the first thing to look for)

ex. Factor each expression

a) $16r^2 - 20r$

$= 4r(4r - 5)$

b) $12n^5p^4 + 8n^4p^3 - 4n^3p^2$

$= 4n^3p^2(3n^2p^2 + 2np - 1)$

Group Factoring

ex. Factor each expression

a) $y^2 + 8xy + 2y + 16x$

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

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

b) $a^2 - a + 3ab - 3b$

$a(a - 1) + 3b(a - 1)$

$(a - 1)(a + 3b)$

Decomposition Factoring ($ax^2 + bx + c$, $a \neq 1$)

ex. Factor each expression

a) $2x^2 + 7x - 4$

$\times$ -8

$+$ $+7$

$8, -1$

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

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

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

b) $3m^2 + 2m - 5$

$\times$ -15

$+$ $+2$

$5, -3$

$3m^2 - 3m + 5m - 5$

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

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

Simple Trinomial Factoring ($x^2 + bx + c$) $a=1$

ex. Factor each expression

a) $x^2 - 3x - 10$

(×) -10
(+) -3
$-5, +2$

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

b) $b^2 - 10b + 24$

(×) 24
(+) -10
$-4, -6$

$(b-4)(b-6)$

$b^4 - 10a^3b^2 + 24a^6$
$(b^2 - 4a^3)(b^2 - 6a^3)$

$b^6 - 10b^3 + 24$
$(b^3 - 4)(b^3 - 6)$

Differece of Squares ($a^2 - b^2$) $= (a-b)(a+b)$ conjugate pair

ex. Factor each expression

a) $x^2 - 81$

$(x-9)(x+9)$

b) $25a^2 - 16c^2$

$(5a + 4c)(5a - 4c)$

$25a^6 - 16c^{14}$
$(5a^3 + 4c^7)(5a^3 - 4c^7)$

Combinations

ex. Factor each expression

a) $-3a^3b - 51a^2b - 30ab$

$= -3ab(a^2 + 17a + 10)$

(×) $+10$
(+) $+17$

b) $30x^2y - 25xy^2 - 30y^3$

$5y(6x^2 - 5xy - 6y^2)$

(×) -36
(+) -5
$-9, +4$

$6x^2 - 9xy + 4xy - 6y^2$
$3x(2x - 3y) + 2y(2x - 3y)$

$5y(2x-3y)(3x+2y)$

c) $7g^3h^2 - 28g^5$

$7g^3(h^2 - 4g^2)$

$7g^3(h-2g)(h+2g)$

d) $m^4 - 3m^2 - 4$

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

(×) -4
(+) -3
$-4, +1$

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

Practice: WS4.0A – work on separate paper