Name: _____

Converting Between Quadratic Forms

Standard	Intercept	Vertex
<u>Standard TO Intercept</u> 1. Factor (GCF first) Ex. 1 $y = x^2 + 6x + 8$ $\underline{2} + \underline{4} = 6$ $\underline{2} \times \underline{4} = 8$ $y = (x+2)(x+4)$ <u>Standard TO Vertex</u> (2 methods) Method 1: completing the square Ex. 2 $y = x^2 + 6x + 8$ $0 = x^2 + 6x + 8$ $\underline{9} + -8 = x^2 + 6x + \underline{9}$ $1 = (x+3)^2$ $y = (x+3)^2 - 1$ Method 2: Substiture a, h, k into equation. Ex. 3 $y = x^2 + 6x + 8$ $a = 1$ $\frac{-6}{2(1)}$ $h = -3$ $k = -1$ $y = (x+3)^2 - 1$	<u>Intercept TO Standard</u> 1. Multiply binomials (foil) 2. Distribute/combine like terms Ex. 1 $y = 2(x + 3)(x - 1)$ $y = 2(x^2 + 2x - 3)$ $y = 2x^2 + 4x - 6$ <u>Intercept TO Vertex</u> 1. convert to standard 2. Follow directions for standard to vertex Ex. 2 $y = 2(x + 3)(x - 1)$ $y = 2x^2 + 4x - 6$ $a = 2$ $\frac{-4}{2(2)} = -1$ $h = -1$ $k = -8$ $y = 2(x+1)^2 - 8$	<u>Vertex TO Standard</u> 1. Square binomials 2. Distribute 3. Combine like terms Ex. 1 $y = 2(x + 3)^2 + 2$ $y = 2(x^2 + 6x + 9) + 2$ $y = 2x^2 + 12x + 18 + 2$ $y = 2x^2 + 12x + 20$ <u>Vertex TO Intercept</u> 1. Convert to standard 2. Factor standard form

Part 1 Packet: Unit 2

Converting Between All Three Forms of Quadratic Functions

Given one of the forms of a quadratic function, convert to the other two forms.

1. $y = x^2 - 6x - 7$ $a = 1$ $h = 3$ $y = (x-3)^2 - 16$ $k = -16$ $\frac{6}{2(1)} = 3$ $(3, -16)$ $y = x^2 - 6x - 7$ $y = (x-7)(x+1)$	Vertex Form: $y = (x-3)^2 - 16$ Factored Form: $y = (x-7)(x+1)$
2. $y = 3(x-1)^2 - 3$ $3(x^2 - 2x + 1) - 3$ $3x^2 - 6x + 3 - 3$ $3x^2 - 6x$ $3x(x-2)$	Standard Form: $y = 3x^2 - 6x$ Factored Form: $y = 3x(x-2)$
3. $y = 2(x-3)(x+5)$ $2(x^2 + 2x - 15)$ $y = 2x^2 + 4x - 30$ $\frac{-4}{2(2)} = -1$ $(-1, -32)$ $a = 2$ $h = -1$ $k = -32$	Vertex Form: $y = 2(x+1)^2 - 32$ Standard Form: $y = 2x^2 + 4x - 30$

4. $y = 2x^2 + 8x + 10$ — supposed to be negative for it to work $a = 2$ $h = -2$ $k = 2$ $\frac{-8}{2(2)} = -2$ $(-2, 2)$ $y = 2(x+2)^2 + 2$ $2x^2 + 8x + 10$ $2(x^2 + 4x + 5)$	Vertex Form: $y = 2(x+2)^2 + 2$ Factored Form: No solution ↓ no x-int exist
5. $y = 2(x+1)^2 - 8$ $2(x^2 + 2x + 1) - 8$ $2x^2 + 4x + 2 - 8$ $y = 2x^2 + 4x - 6$ ↓ $y = 2(x^2 + 2x - 3)$ $y = 2(x+3)(x-1)$ $\frac{3}{3} \times \frac{-1}{} = -3$ $\frac{3}{3} + \frac{-1}{} = 2$	Standard Form: $y = 2x^2 + 4x - 6$ Factored Form: $y = 2(x+3)(x-1)$
6. $y = -4(x+1)(2x-5)$ $y = -4(2x^2 - 5x + 2x - 5)$ $y = -4(2x^2 - 3x - 5)$ $y = -8x^2 + 12x + 20$ $a = -8$ $h = 3/4$ $k = 24.5$ $\frac{-12}{2(-8)} = \frac{-\cancel{12}^{3}}{-\cancel{16}_{4}}$	Vertex Form: $y = -8(x - 3/4) + 24.5$ Standard Form: $y = -8x^2 + 12x + 20$

Answers:

1. $y = (x-3)^2 - 16$	$y = (x-7)(x+1)$	**4.** $y = 2(x+2)^2 - 13$	$y = 2(x+5)(x-1)$
2. $y = 3x^2 - 6x$	$y = 3x(x-2)$	**5.** $y = 2x^2 + 4x - 6$	$y = 2(x+3)(x-1)$
3. $y = 2(x+1)^2 - 32$	$y = 2x^2 + 4x - 30$	**6.** $y = -4(2x-5)(x+1)$	$y = -8x^2 + 12x + 20$

$x^2 - x + 5x - 5$
$x^2 + 4x - 5$