Algebra 1 Graphing Quadratics Notes

Name: Notes Date: _____

Converting Forms of a Quadratic Notes

Convert from vertex form to standard form by <u>Multiplying it Out</u> ☺

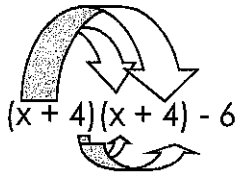
$$y = (x + 4)^2 - 6$$

<u>Steps</u>:

1. Rewrite the equation as a product of two binomials

$$(x + 4)(x+4) - 6$$

2. Use FOIL to simplify



$$(x^2 + 4x + 4x + 16)-6$$

3. Combine like terms

$$x^2 + 8x +10$$

Convert from vertex form to standard form by multiplying the function out.

1. $f(x)=(x-1)^2+8$

$= (x-1)(x-1)+8$

$= x^2-x-x+1+8$

$= x^2-2x+9$

2. $f(x)=2(x+3)^2-5$

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

$= 2(x^2+3x+3x+9)-5$

$= 2(x^2+6x+9)-5$

$= 2x^2+12x+18-5$

$= 2x^2+12x+13$

3. $f(x)=-(x-4)^2+3$

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

$= -(x^2-4x+4x+16)+3$

$= -(x^2-8x+16)+3$

$= -x^2+8x-16+3$

$= -x^2+8x-13$

4. $f(x)=2(x+1)^2-2$

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

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

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

$= 2x^2+4x+2-2$

$= 2x^2+4x$

Convert from standard form to vertex form by <u>completing the square</u>. BEWARE OF THE A VALUE.

<u>Steps</u>:

$y = x^2 + 8x + 10$

$y - 10 + \_\_ = x^2 + 8x + \_\_$

$y - 10 + \underline{16} = x^2 + 8x + \underline{16}$

$\left(\frac{8}{2}\right)^2$

$y + 6 = (x+4)^2$

$y = (x+4)^2 - 6$

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9) $f(x) = x^2 + 8x + 1$

$y - 1 = x^2 + 8x$

$y - 1 + \underline{16} = x^2 + 8x + \underline{16}$

$y + 15 = (x+4)^2$

$y = (x+4)^2 - 15$

10) $f(x) = x^2 + 10x + 20$

$y - 20 = x^2 - 10x$

$y - 20 + \underline{25} = x^2 - 10x + \underline{25}$

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

$y = (x-5)^2 - 5$

A VALUES OTHER THAN 1

11) $f(x) = 3x^2 - 6x + 5$

$y - 5 = 3x^2 - 6x$

$y - 5 = 3(x^2 - 2x + \underline{1})$

$+3(1)$

$y - 3 = 3(x-1)^2$

$y = 3(x-1)^2 + 3$

12) $f(x) = -2x^2 - 16x - 32$

$y + 32 = -2x^2 - 16x$

$y + 32 + \_\_ = -2(x^2 + 8x + \underline{16})$

$-2(16)$

$y + 32 - 32 = -2(x+4)^2$

$y = -2(x+4)^2$