

Name: _____

Expanding Vertex Form (Converting to Standard Form)

To convert from vertex form to standard form, you must expand and simplify your binomial exponent, which means you need to multiply $(x - h)$ by itself and simplify.

$1(x - h)^2 + 0$	EXAMPLE $(x - 4)^2$	1. $(x + 6)^2$	2. $(x - 5)^2$
Expand	$(x - 4)(x - 4)$		
Distribute 1 st group	$x(x - 4) - 4(x - 4)$		
Distribute into each group & simplify to $1x^2 + b_1x + b_2x + c$	$(x)(x) - 4(x) - 4(x) - 4(-4)$ $x^2 - 4x - 4x + 16$ <div>$(b_1)(b_2) = (-4)(-4)$ $= 16$</div> <div>$b_1 + b_2 = (-4) + (-4)$ $= -8$</div>	<div>$(b_1)(b_2) =$</div> <div>$b_1 + b_2 =$</div>	<div>$(b_1)(b_2) =$</div> <div>$b_1 + b_2 =$</div>
Simplify to $1x^2 + bx + c$	<div>$x^2 - 8x + 16$</div> <div>$(a)(c) = (1)(16) = 16$</div> <div>$b = -8$</div>	<div>$(a)(c) =$</div> <div>$b =$</div>	<div>$(a)(c) =$</div> <div>$b =$</div>

$1(x - h)^2 + 0$	3. $(x + 3)^2$	4. $(x - 10)^2$	5. $(x + 7)^2$
Expand			
Distribute 1 st group			
Distribute into each group & simplify to $1x^2 + b_1x + b_2x + c$	<div>$(b_1)(b_2) =$</div> <div>$b_1 + b_2 =$</div>	<div>$(b_1)(b_2) =$</div> <div>$b_1 + b_2 =$</div>	<div>$(b_1)(b_2) =$</div> <div>$b_1 + b_2 =$</div>
Simplify to $1x^2 + bx + c$	<div>$(a)(c) =$</div> <div>$b =$</div>	<div>$(a)(c) =$</div> <div>$b =$</div>	<div>$(a)(c) =$</div> <div>$b =$</div>

$a(x - h)^2 + 0$	EXAMPLE $3(x - 4)^2$	6. $-2(x + 6)^2$	7. $4(x - 5)^2$
Expand	$3(x - 4)(x - 4)$		
Distribute 1 st group	$3[x(x - 4) - 4(x - 4)]$		
Distribute into the groups	$3[(x)(x) - 4(x) - 4(x) - 4(-4)]$ $3[x^2 - 4x - 4x + 16]$		
Distribute a & simplify to $ax^2 + b_1x + b_2x + c$	$3x^2 - 12x - 12x + 48$		
Simplify to $ax^2 + bx + c$	<div>$3x^2 - 24x + 48$</div>		

$a(x - h)^2 + 0$	8. $-(x + 3)^2$	9. $5(x - 10)^2$	10. $2(x + 7)^2$
Expand			
Distribute 1 st group			
Distribute into the groups			
Distribute a & simplify to $ax^2 + b_1x + b_2x + c$			
Simplify to $ax^2 + bx + c$			

$a(x - h)^2 + k$	EXAMPLE $3(x - 4)^2 - 2$	11. $-2(x + 6)^2 - 4$	12. $4(x - 5)^2 + 3$
Expand	$3(x - 4)(x - 4) - 2$		
Distribute 1 st group	$3[x(x - 4) - 4(x - 4)] - 2$		
Distribute into the groups	$3[(x)(x) - 4(x) - 4(x) - 4(-4)] - 2$ $3[x^2 - 4x - 4x + 16] - 2$		
Distribute a & simplify to $ax^2 + b_1x + b_2x + c$	$3x^2 - 12x - 12x + 48 - 2$		
Simplify to $ax^2 + bx + c$	$3x^2 - 24x + 46$		

$a(x - h)^2 + k$	13. $-(x + 3)^2 + 7$	14. $5(x - 10)^2 - 1$	15. $2(x + 7)^2 + 5$
Expand			
Distribute 1 st group			
Distribute into the groups			
Distribute a & simplify to $ax^2 + b_1x + b_2x + c$			
Simplify to $ax^2 + bx + c$			