The Roles of *a, h* and *k* in Vertex Form

Equation	Value of *a*	Value of *h*	Value of *k*	Vertex (h, k)	# of *x*-Intercepts	Transformations	Domain & Range
$y = 3(x - 2)^2 + 1$	7	2	1	(2, 1)	0	• vertical stretch by a factor of 3 • horizontal translation 2 units right • vertical translation 1 unit up	D: $\{x \in R\}$ R: $\{y \in R, y \geq 1\}$
$y = -2(x - 3)^2 + 3$							
$y = \frac{1}{2}(x + 1)^2 + 5$							
$y = 0.3(x + 2)^2 + 15$							
$y = -\frac{2}{3}(x - 4)^2 - 8$							
$y = 2x^2 + 9$							
$y = -3(x + 5)^2$							

The Roles of *a, h* and *k* in Vertex Form

Equation	Value of *a*	Value of *h*	Value of *k*	Vertex (*h, k*)	# of *x*-Intercepts	Transformations	Domain & Range
$y = 3(x - 2)^2 + 1$	7	2	1	(2, 1)	0	• vertical stretch by a factor of 3 • horizontal translation 2 units right • vertical translation 1 unit up	D: $\{x \in R\}$ R: $\{y \in R, y \geq 1\}$
$y = -2(x - 3)^2 + 3$	-2	3	3	(3, 3)	2	reflect in x-axis vertical stretch right 3 up 3	D = $\{x \in R\}$ R = $\{y \leq 3\}$
$y = \frac{1}{2}(x +1)^2 +5$	$\frac{1}{2}$	-1	5	(-1, 5)	0	vertical compress left 1 up 5	$x \in R$ $y \geq 5$
$y = 0.3(x + 2)^2 + 15$	0.3	-2	15	(-2, 15)	0	vertical compress left 2 up 15	$x \in R$ $y \geq 15$
$y = -\frac{2}{3}(x - 4)^2 - 8$	$-\frac{2}{3}$	4	-8	(4, -8)	0	reflect in x-axis vertical compress right 4 down 8	$x \in R$ $y \leq -8$
$y = 2x^2 + 9$	2	0	9	(0, 9)	0	vertical stretch up 9	$x \in R$ $y \geq 9$
$y = -3(x + 5)^2$	-3	-5	0	(-5, 0)	1	reflect in x-axis vertical stretch left 5	$x \in R$ $y \leq 0$