Name: _____

Using Given Information to Write Quadratic Equations

Now that you are able to identify the parts on a quadratic graph (a, b, c, h, k, r_1 & r_2), you must be able to write a quadratic equation using those parts. There are 3 quadratic equation forms:

Standard Form $f(x) = ax^2 + bx + c$	Vertex Form $f(x) = a(x-h)^2 + k$	Factored Form $f(x) = a(x-r_1)(x-r_2)$
In this form, you simply plug in a, b & c as they are – make sure to bring their signs (+ -) with them.	In this form, you plug in a & k as they are – bringing their signs (+ -) with them. But, when you plug in ***h*,** you **must switch** the sign.	In this form, you plug in a as it is – bringing its sign (+ -) with it. But, when you plug in the ***r's*,** you **must switch** their signs.
Example: $a = 3$ $b = -12$ $c = 9$ $h = 2$ $k = -3$ $r_1 = -3$ $r_2 = -1$	**Example:** $a = 3$ $b = -12$ $c = 9$ $h = 2$ $k = -3$ $r_1 = -3$ $r_2 = -1$	**Example:** $a = 3$ $b = -12$ $c = 9$ $h = 2$ $k = -3$ $r_1 = -3$ $r_2 = -1$
$f(x) = \boxed{a}x^2\boxed{+b}x\boxed{+c}$ $a = 3, b = -12, c = +9$ $f(x) = \boxed{3}x^2\boxed{-12}x\boxed{+9}$ So, **standard form** is: $f(x) = 3x^2 - 12x + 9$	$f(x) = \boxed{a}\left(x\boxed{-h}\right)^2\boxed{+k}$ $a = 3, \cancel{h = +2}, k = -3$ *Switched* $h = -2$*!!* $f(x) = \boxed{3}\left(x\boxed{-2}\right)^2\boxed{-3}$ So, **vertex form** is: $f(x) = 3(x-2)^2 - 3$	$f(x) = \boxed{a}\left(x\boxed{-r_1}\right)\left(x\boxed{-r_2}\right)$ $a = 3, \cancel{r_1 = -3}, \cancel{r_2 = -1}$ *Switched* $r_1 = +3$ & $r_2 = +1$ $f(x) = \boxed{3}\left(x\boxed{+3}\right)\left(x\boxed{+1}\right)$ So, **factored form** is: $f(x) = 3(x+3)(x+1)$

For each set of quadratic information, write the quadratic in <u>standard form</u>, <u>vertex form</u> and <u>factored form</u>.

EXAMPLE

$a = -5$
$b = -40$
$c = -3$
$h = 4$
$k = 5$
$r_1 = 3$
$r_2 = 5$

Standard Form:

$f(x) = ax^2 + bx + c$

$\boxed{f(x) = -5x^2 - 40x - 3}$

Vertex Form: *switch h's sign (but not k's)!*

$f(x) = a(x-h)^2 + k$

$\boxed{f(x) = -5(x-4)^2 + 5}$

Factored Form: *switch the signs for r_1 & r_2!*

$f(x) = a(x-r_1)(x-r_2)$

$\boxed{f(x) = -5(x-3)(x-5)}$

1.

$a = -1$
$b = -6$
$c = -5$
$h = -3$
$k = 4$
$r_1 = -5$
$r_2 = -1$

Standard Form:

Vertex Form:

Factored Form:

2.

$a = -3$
$b = 0$
$c = 3$
$h = 0$
$k = 3$
$r_1 = -1$
$r_2 = 1$

Standard Form:

Vertex Form:

Factored Form:

3.

$a = 2$
$b = 8$
$c = 8$
$h = -2$
$k = 0$
$r_1 = -2$
$r_2 = -2$

Standard Form:

Vertex Form:

Factored Form:

4.

$a = -2$
$b = 4$
$c = 6$
$h = -1$
$k = 8$
$r_1 = -3$
$r_2 = 1$

Standard Form:

Vertex Form:

Factored Form:

5.

$a = 1$
$b = 2$
$c = -8$
$h = -1$
$k = -9$
$r_1 = -4$
$r_2 = 2$

Standard Form:

Vertex Form:

Factored Form:

6.
$a = 3$
$b = -6$
$c = -9$
$h = 1$
$k = -12$
$r_1 = -1$
$r_2 = 3$

Standard Form:

Vertex Form:

Factored Form:

7.
$a = -1$
$b = 0$
$c = 4$
$h = 0$
$k = 4$
$r_1 = -2$
$r_2 = 2$

Standard Form:

Vertex Form:

Factored Form:

8.
$a = 2$
$b = 0$
$c = -8$
$h = 0$
$k = -8$
$r_1 = -2$
$r_2 = 2$

Standard Form:

Vertex Form:

Factored Form:

9.
$a = 3$
$b = -6$
$c = 3$
$h = 1$
$k = 0$
$r_1 = 1$
$r_2 = 1$

Standard Form:

Vertex Form:

Factored Form:

10.
$a = 4$
$b = 40$
$c = 84$
$h = -5$
$k = -16$
$r_1 = -7$
$r_2 = -3$

Standard Form:

Vertex Form:

Factored Form:

11.
$a = -7$
$b = -42$
$c = -63$
$h = -3$
$k = 0$
$r_1 = -3$
$r_2 = -3$

Standard Form:

Vertex Form:

Factored Form:

12.
$a = 5$
$b = -40$
$c = 75$
$h = 4$
$k = -5$
$r_1 = 3$
$r_2 = 5$

Standard Form:

Vertex Form:

Factored Form:

13.
$a = -10$
$b = -40$
$c = 0$
$h = 2$
$k = 40$
$r_1 = 0$
$r_2 = 4$

Standard Form:

Vertex Form:

Factored Form: