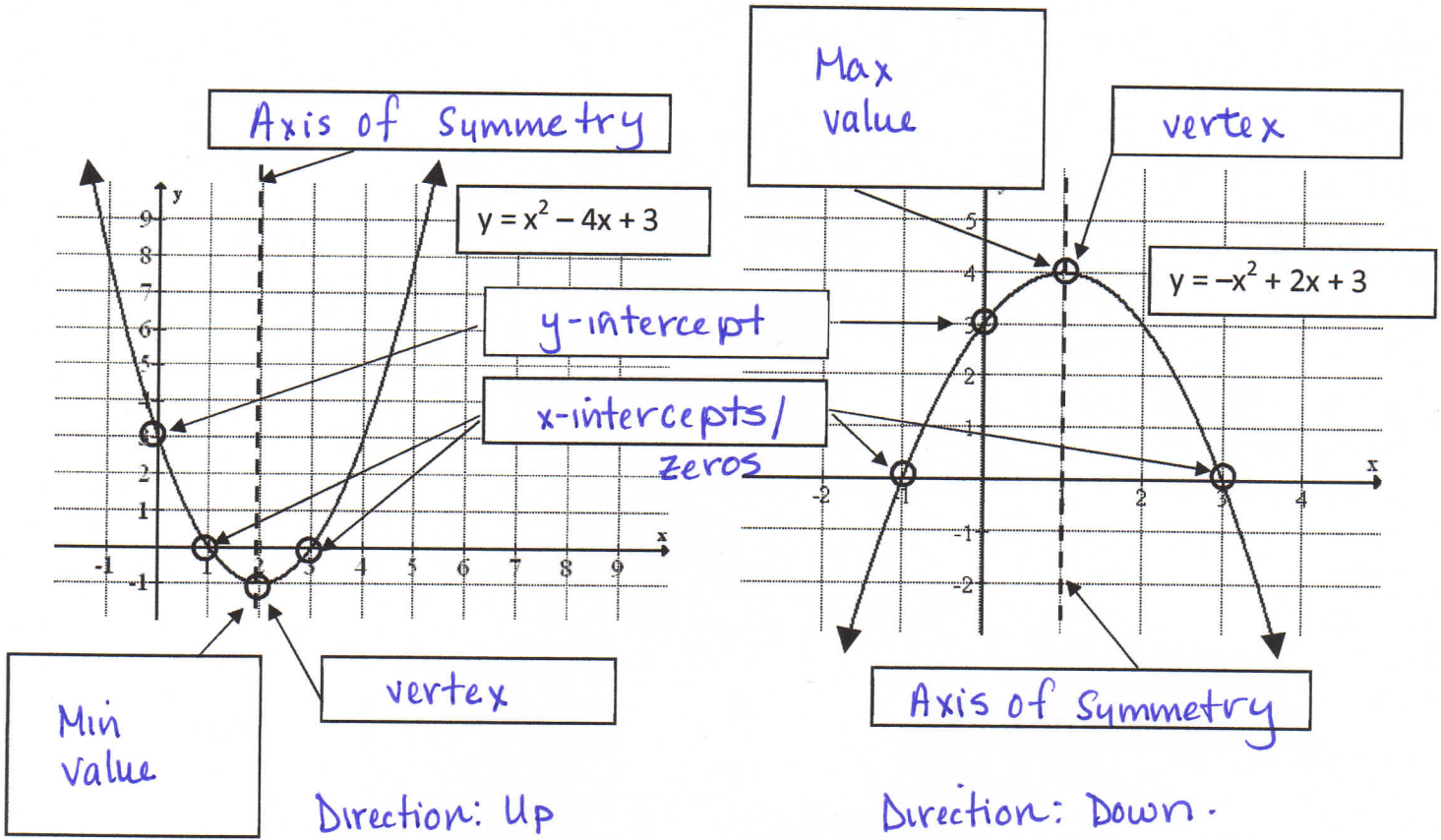


QUADRATIC RELATIONS: Vertex Form

Date: Notes

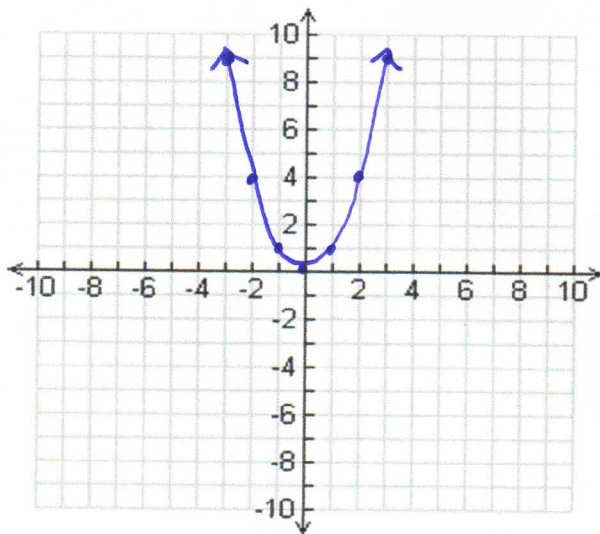
REVIEW: Key Features of a Parabola

Using the list of terms provided, label the key features of a parabola on the following diagram and their values: **Vertex, Minimum, Maximum, Axis of Symmetry, y-intercept, x-intercepts.**



EXAMPLE: Graph the standard parabola $y = x^2$ and state the key features.

x	y
-3	$(-3)^2 = 9$
-2	$(-2)^2 = 4$
-1	$(-1)^2 = 1$
0	$(0)^2 = 0$
1	$(1)^2 = 1$
2	$(2)^2 = 4$
3	$(3)^2 = 9$



Vertex	$(0, 0)$
Axis of symmetry	$x = 0$
Opens Up or Down	up
Max or Min value	min = 0
y-intercept	0
x-intercept(s)	0

QUADRATIC RELATIONS: Vertex Form

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3 Different Forms of the Equation for a Parabola

	Name of Form	General Form	Example	What does this form tell us?
1	Vertex form	$y = a(x-h)^2 + k$	$y = (x+3)^2 - 4$	vertex Ex. (-3, -4)
2	Standard Form	$y = ax^2 + bx + c$	$y = x^2 + 6x + 5$	y-intercept Ex. (0, 5)
3	Factored Form	$y = a(x-r)(x-s)$	$y = (x+5)(x+1)$	x-intercepts/zeros Ex. (-5, 0) (-1, 0)

★ **IMPORTANT** – The three equations above are for the same parabola, they are just shown in 3 different forms.

EXAMPLES:

What **form** are the following quadratic equations in?

a) $y = (x-3)(x+2)$ Factored

b) $y = 16x^2 + 12x - 41$ Standard

c) $y = 11(x-17)(x+5)$ Factored

d) $y = -3(x+2)^2 - 8$ Vertex

VERTEX FORM: $y = a(x-h)^2 + k$

★ Coordinates of the **vertex** are (h,k) → h is the x-coordinate Ex// $y = 2(x-2)^2 + 5$

→ k is the y-coordinate vertex (2, 5)

★ When a is positive, parabola opens up Ex// $y = 4(x-6)^2 + 5$

★ When a is negative, parabola opens down Ex// $y = -2(x-1)^2 + 4$

★ y-intercept let $x=0$, solve for y.