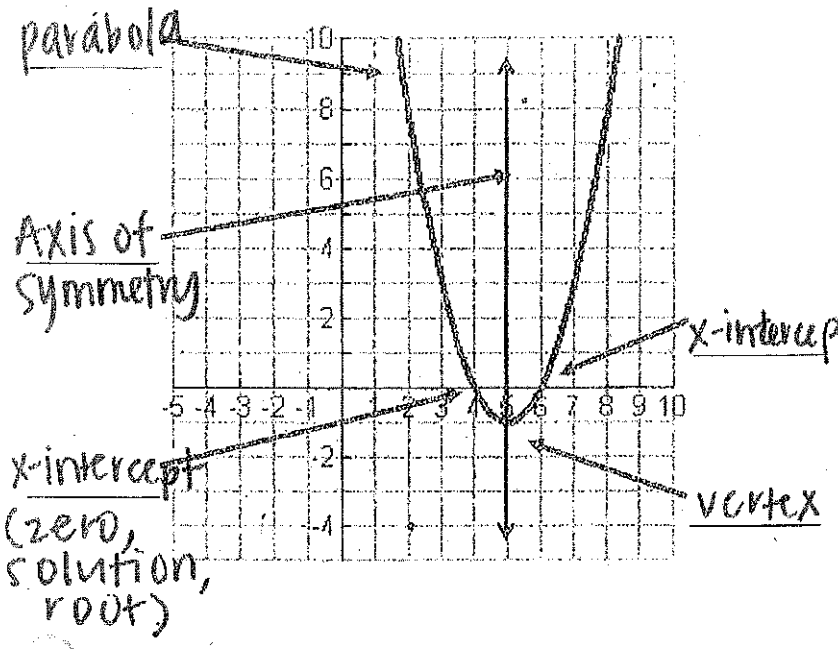
Algebra 1
Intro to Quadratic Characteristics

Name: key
Date: _____

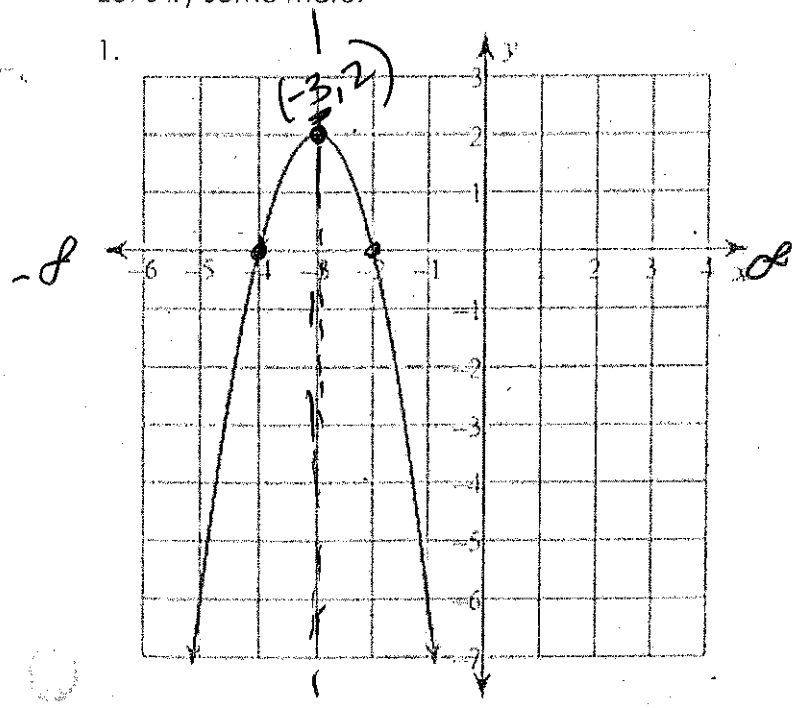
Look at the graph below. Are there any similarities or characteristics you know based on what you learned about linear equations? Are there any characteristics applying to quadratics that are new or different?



CHARACTERISTICS	
Vertex	(5,-1)
Domain (x)	(-∞,∞)
Range (y)	[-1,∞)
Increasing Interval x-values	(5,∞)
Decreasing Interval x-values	(-∞,5)
Zeros	(4,0) (6,0)
Y-intercept	not shown
Maximum	None
Minimum y-value	-1
Axis of Symmetry	x=5
Left End Behavior	As x→-∞, y→ ∞
Right End Behavior	As x→∞, y→ ∞

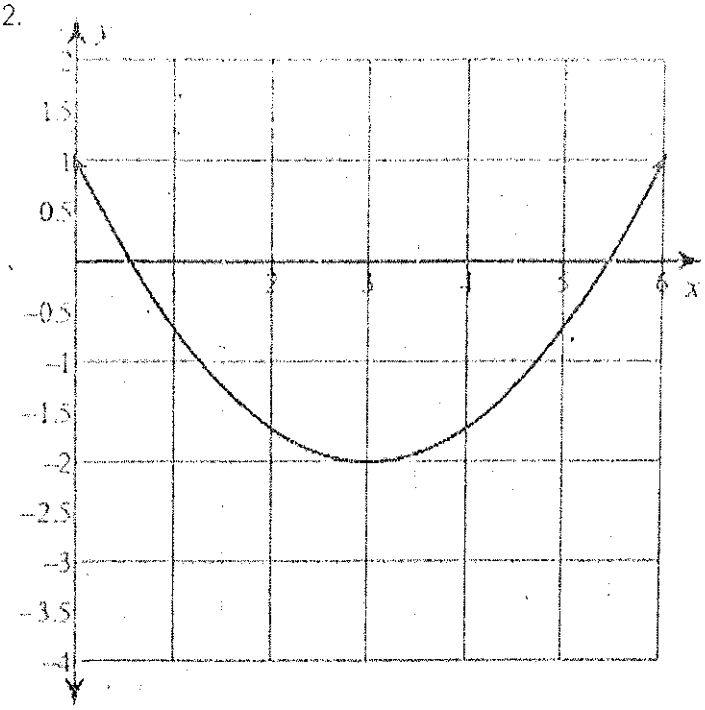
Let's try some more!

1.



CHARACTERISTICS	
Vertex	(-3,2)
Domain	(-∞,∞)
* Range	(-∞,2]
Increasing Interval	(-∞,-3)
Decreasing Interval	(-3,∞)
Zeros	(-4,0) (-2,0)
Y-intercept	not shown
Maximum	2
Minimum	None
Axis of Symmetry	x=-3
Left End Behavior	As x→-∞, y→ -∞
Right End Behavior	As x→∞, y→ -∞

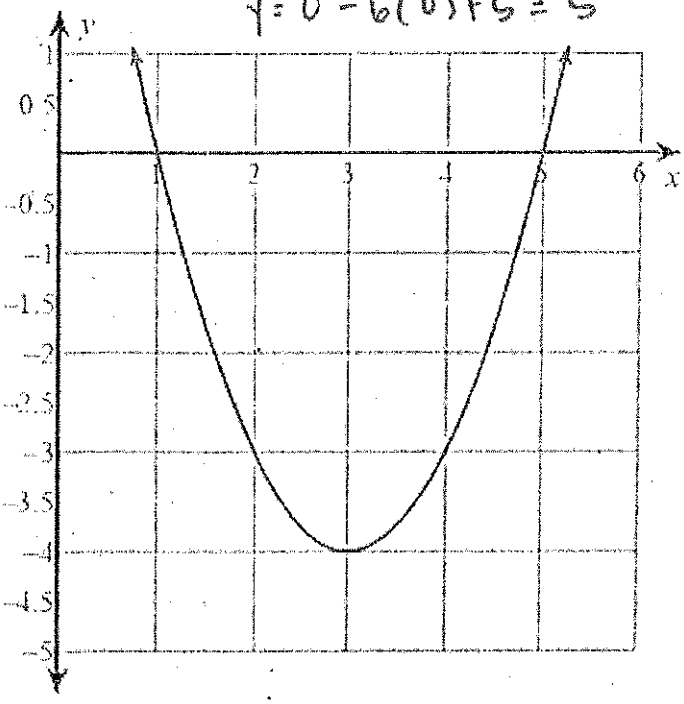
2.



CHARACTERISTICS	
Vertex	(3, -2)
Domain	(-∞, ∞)
Range	[-2, ∞)
Increasing Interval	(3, ∞)
Decreasing Interval	(-∞, 3)
Zeros	(0.6, 0)(5.4, 0)
Y-intercept	(0, 1)
Maximum	None
Minimum	-2
Axis of Symmetry	x = 3
Left End Behavior	As x→-∞, y→ ∞
Right End Behavior	As x→∞, y→ ∞

3. $y = x^2 - 6x + 5$ plug in 0 for x [y-int]

$y = 0^2 - 6(0) + 5 = 5$



CHARACTERISTICS	
Vertex	(3, -4)
Domain	(-∞, ∞)
Range	[-4, ∞)
Increasing Interval	(3, ∞)
Decreasing Interval	(-∞, 3)
Zeros	(1, 0) (5, 0)
Y-intercept	(0, 5)
Maximum	None
Minimum	-4
Axis of Symmetry	x = 3
Left End Behavior	As x→-∞, y→ ∞
Right End Behavior	As x→∞, y→ ∞

How could you find the zeros without looking at the graph? *Think back to last semester!*

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

$(x-5)(x-1) = 0$

$x - 5 = 0 \quad x - 1 = 0$

$x = 5, 1$

$(5, 0) \ (1, 0)$

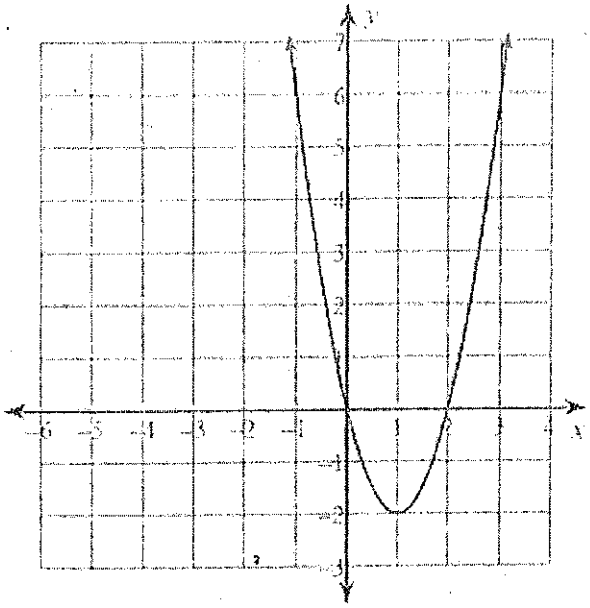
same as zeros!

Algebra 1
Homework – Quadratic Characteristics

Name: Key
Date: _____

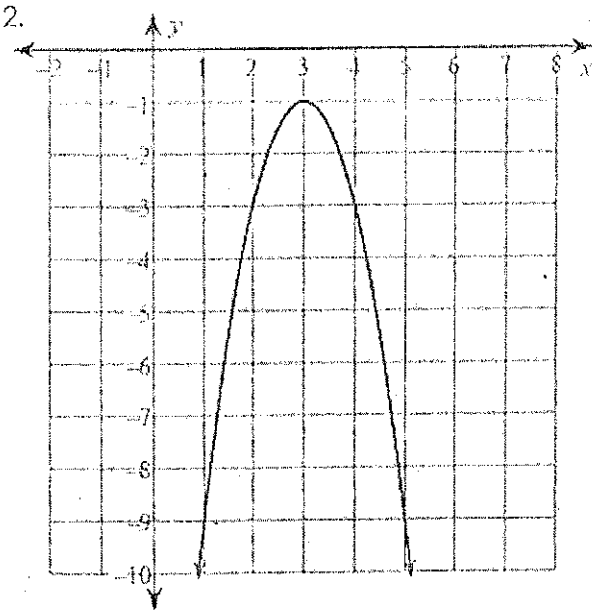
Fill in the characteristics of the given quadratic equation.

1.



CHARACTERISTICS	
Vertex	(1, -2)
Domain	(-∞, ∞)
Range	[-2, ∞)
Increasing Interval	(1, ∞)
Decreasing Interval	(-∞, 1)
Zeros	(0,0) (2,0)
Y-intercept	(0,0)
Maximum	None
Minimum	-2
Axis of Symmetry	x = 1
Left End Behavior	As x→-∞, y→ ∞
Right End Behavior	As x→∞, y→ ∞

2.



CHARACTERISTICS	
Vertex	(3, -1)
Domain	(-∞, ∞)
Range	(-∞, -1]
Increasing Interval	(-∞, 3)
Decreasing Interval	(3, ∞)
Zeros	NONE
Y-intercept	not shown
Maximum	-1
Minimum	NONE
Axis of Symmetry	x = 3
Left End Behavior	As x→-∞, y→ -∞
Right End Behavior	As x→∞, y→ -∞

KEY

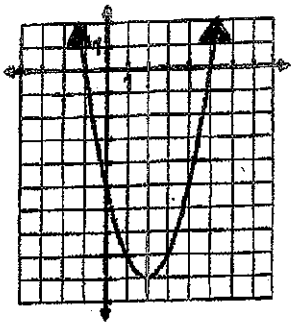
1. Domain: $(-\infty, \infty)$ Range: $[-9, \infty)$

Vertex: $(2, -9)$ Extrema: $y = -9$

X Intercept(s): $(-1,0)(5,0)$ Y Intercept: $(0, -5)$

Increasing: $(2, \infty)$ Decreasing: $(-\infty, 2)$

Axis of Symmetry: $x = 2$



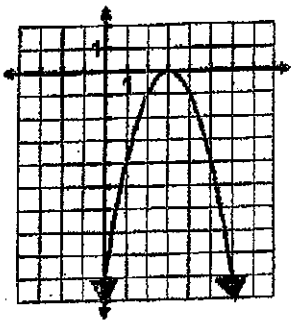
2. Domain: $(-\infty, \infty)$ Range: $(-\infty, 0]$

Vertex: $(3, 0)$ Extrema: $y = 0$

X intercept(s): $(3, 0)$ Y Intercept: $(0, -9)$

Increasing: $(-\infty, 3)$ Decreasing: $(3, \infty)$

Axis of Symmetry: $x = 3$



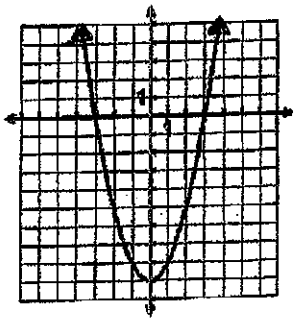
3. Domain: $(-\infty, \infty)$ Range: $[-9, \infty)$

Vertex: $(0, -9)$ Extrema: $y = -9$

X intercept(s): $(-3,0)(3,0)$ Y Intercept: $(0, -9)$

Increasing: $(0, \infty)$ Decreasing: $(-\infty, 0)$

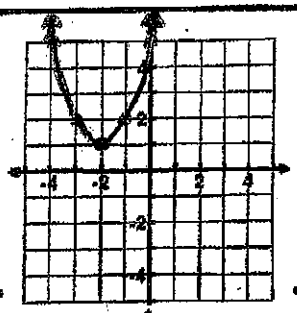
Axis of Symmetry: $x = 0$

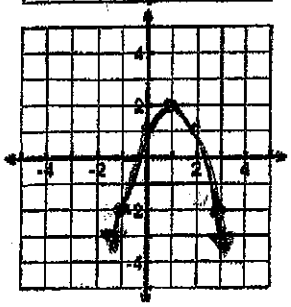


Use the information to sketch a quadratic.

4. Domain: all real numbers OR $(-\infty, \infty)$
Range: $y \geq 1$ OR $[1, \infty)$

Increasing: $-2 < x < \infty$ OR $(-2, \infty)$
Decreasing: $-\infty < x < -2$ OR $(-\infty, -2)$
There is no stretch or shrink (a = 1)



5. Domain: all real numbers OR $(-\infty, \infty)$
Vertex: (1,2)

Increasing: $-\infty < x < 1$ OR $(-\infty, 1)$
Decreasing: $1 < x < \infty$ OR $(1, \infty)$
There is no stretch or shrink (a = 1)