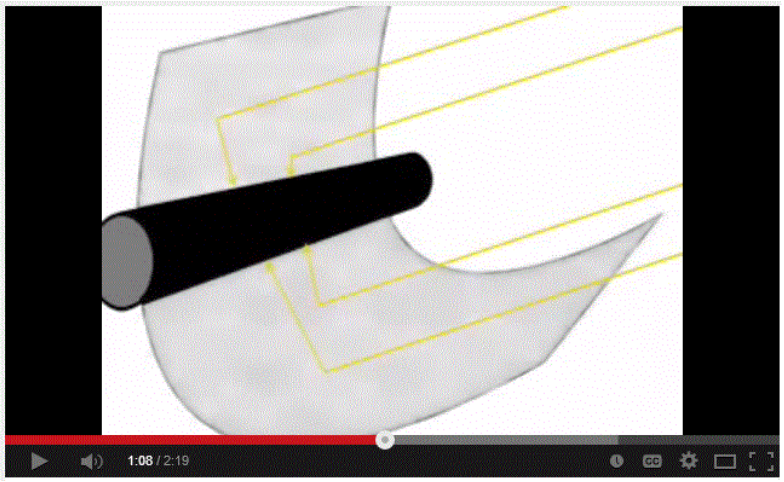
Quadratic Functions - Engaging Resources

RF SO1 - Quadratic Functions Videos

These videos may be useful in various ways. The "Giant Slide" may be used as an interesting introduction to parabolas and begin a discussion on whether we should believe everything we see on YouTube. "Parabolas in the Real World" provides a number of nice examples.



RF SO1 - Characteristics from Functions Chart

(Download: Blank Chart.docx, Completed Chart.docx)

Students love this chart as a study tool and a way to see the big picture. It was assisted in determining the various strengths of the different forms of the quadratic function. Lessons may simply consist of completing each section of the chart and providing students with some practice on that skill.

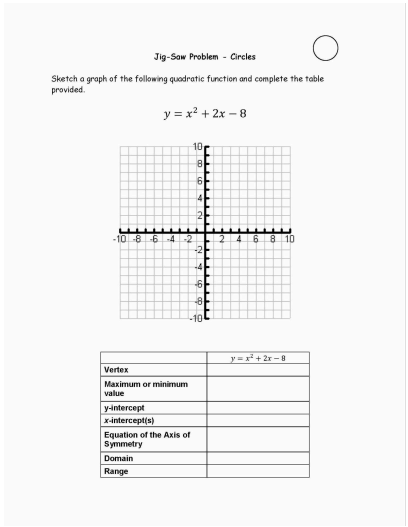
Characteristics from equations of Quadratic Functions **Name:** _____

Characteristic	***Standard Form*** $y = ax^2 + bx + c$	***Factored Form*** $y = a(x-r)(x-s)$	***Vertex Form*** $y = a(x-h)^2 + k$
y-intercept	set x=0 and solve for y y-int = c	set x=0 and solve for y	set x=0 and solve for y
x-intercept	set y=0 and solve for x Quadratic Formula	set y=0 and solve for x Set each factor = 0 and solve	set y=0 and solve for x plus/minus square root
Vertex	*x-coordinate*: average of x-ints (symmetry) *y-coordinate*: sub x-coordinate into equation	*x-coordinate*: average of x-ints (symmetry) *y-coordinate*: sub x-coordinate into equation	Vertex = V(h,k)
Direction of Opening	Opens up when a > 0 (positive) Opens down when a < 0 (negative)	Opens up when a > 0 Opens down when a < 0	Opens up when a > 0 Opens down when a < 0
Axis of Symmetry	Use Vertex V(h,k) to find axis of symmetry: x = h	Use Vertex V(h,k) to find axis of symmetry: x = h	Use Vertex V(h,k) to find axis of symmetry: x = h
Domain	Always $x \in R$ unless there is a context.	Always $x \in R$ unless there is a context.	Always $x \in R$ unless there is a context.
Range	Use Vertex V(h,k) and Direction of Opening $y \geq k, y \in R$ (up) or $y \leq k, y \in R$ (down)	Use Vertex V(h,k) and Direction of Opening $y \geq k, y \in R$ (up) or $y \leq k, y \in R$ (down)	Use Vertex V(h,k) and Direction of Opening $y \geq k, y \in R$ (up) or $y \leq k, y \in R$ (down)

RF SO1 - JigSaw Activity: Forms of Quadratic Functions

(Download: JigSaw Equation Forms.docx)

This JigSaw is fun in that when the groups get back together they will all realize that they graphed the same function even though the equations did not look the same. This reinforces the idea that one quadratic function may be in various forms.

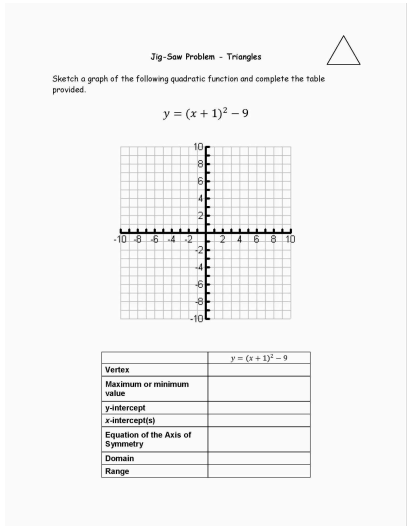


Jig-Saw Problem - Circles

Sketch a graph of the following quadratic function and complete the table provided.

$y = x^2 + 2x - 8$

	$y = x^2 + 2x - 8$
Vertex	
Maximum or minimum value	
y-intercept	
x-intercept(s)	
Equation of the Axis of Symmetry	
Domain	
Range	

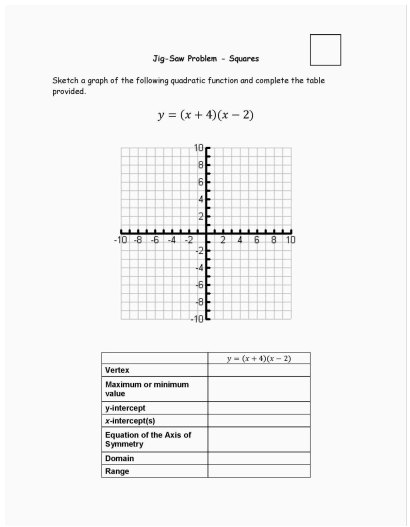


Jig-Saw Problem - Triangles

Sketch a graph of the following quadratic function and complete the table provided.

$y = (x + 1)^2 - 9$

	$y = (x + 1)^2 - 9$
Vertex	
Maximum or minimum value	
y-intercept	
x-intercept(s)	
Equation of the Axis of Symmetry	
Domain	
Range	

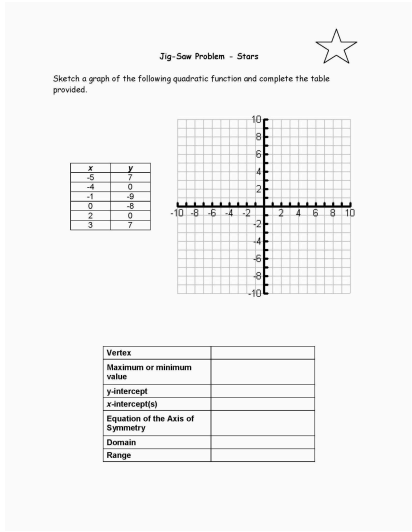


Jig-Saw Problem - Squares

Sketch a graph of the following quadratic function and complete the table provided.

$y = (x + 4)(x - 2)$

	$y = (x + 4)(x - 2)$
Vertex	
Maximum or minimum value	
y-intercept	
x-intercept(s)	
Equation of the Axis of Symmetry	
Domain	
Range	



Jig-Saw Problem - Stars

Sketch a graph of the following quadratic function and complete the table provided.

x	y
-5	7
-4	0
-1	-9
0	-8
2	0
3	7

Vertex	
Maximum or minimum value	
y-intercept	
x-intercept(s)	
Equation of the Axis of Symmetry	
Domain	
Range	

RF SO1 - Modelling Quadratics

Quadratic graphs are everywhere you look. They can describe the paths of rockets, balls and jets of water. Because of their symmetry you will see parabolas in bridges, buildings, sand dunes... Understanding their equations is hence hugely important in the fields of engineering and science. This activity uses dynamic geometry software to help students understand the graph of quadratics in the form **$y = a(x - b)^2 + c$.**