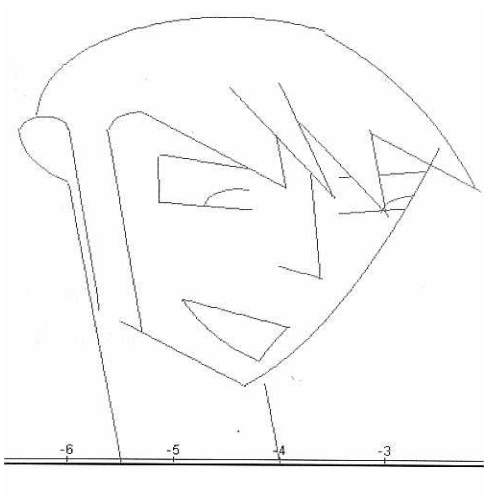
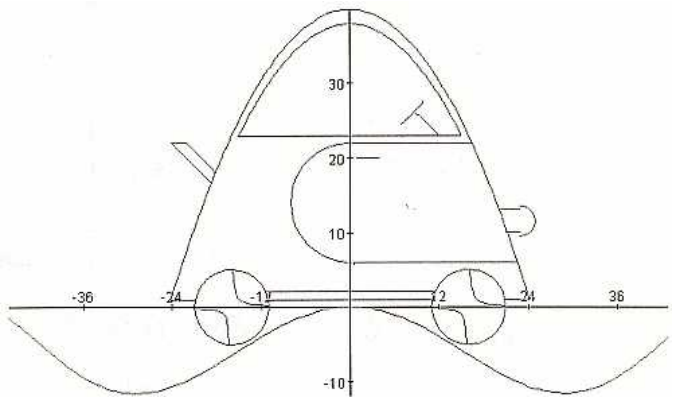
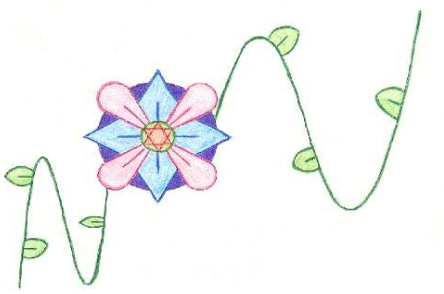
Pure Math 20 Quadratic, Polynomial and Nonlinear Functions Project

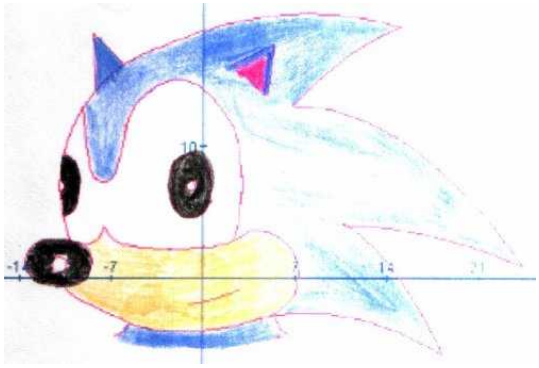
This project involves creating a picture using straight lines defined by mathematical functions. The content of the picture is entirely of **your** choosing. It can be a picture of an object, abstract art, or a word whose letters have been created with straight lines.

In the past, students have created the following pictures for a similar project:









The marking guide for this project is shown on the next page. Use this as a checklist to make sure you have all required elements before you hand in your project.

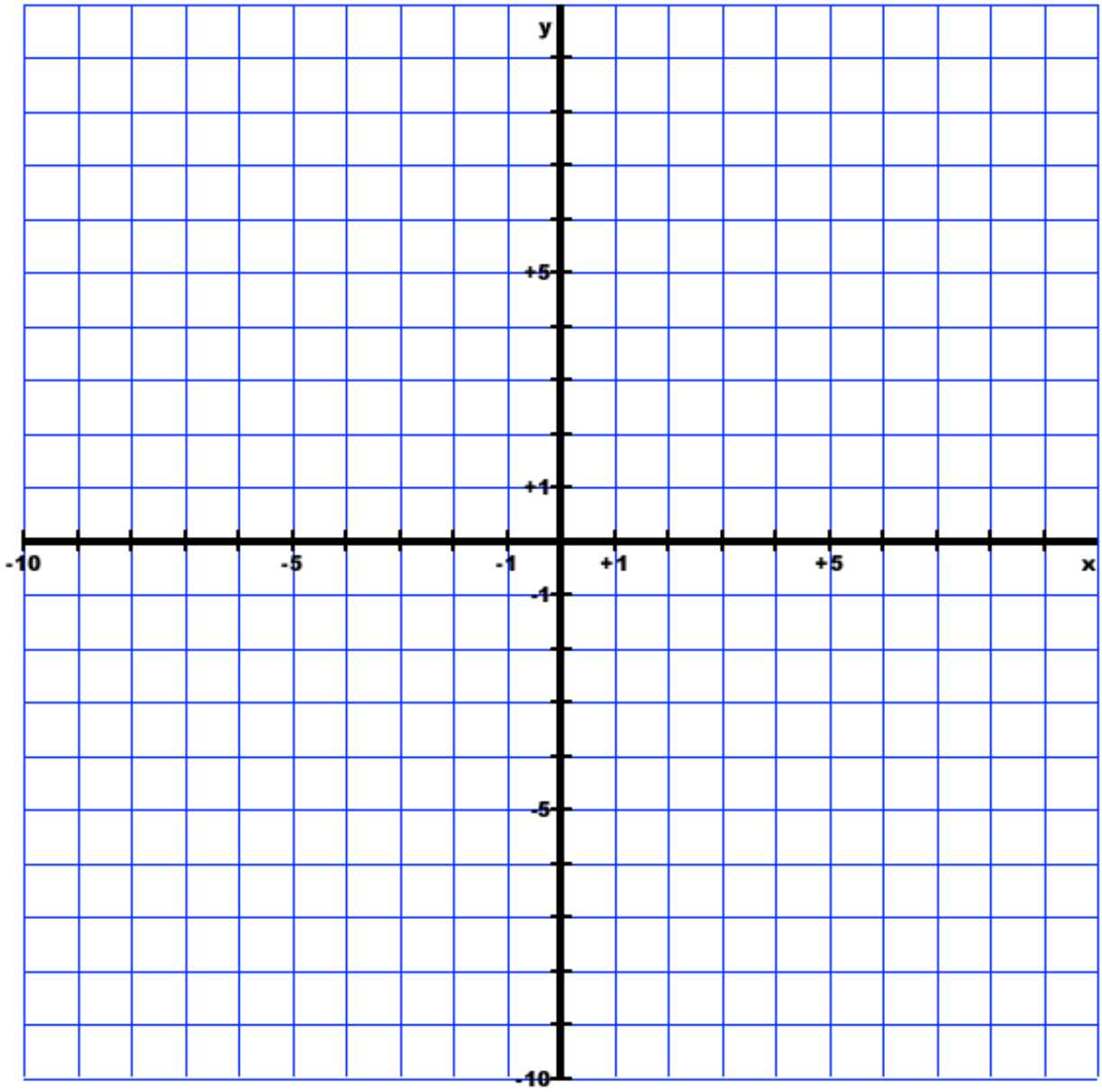
Name:_____

Page(s)	*Required Contents*	*Marks*
1	This mark sheet.	

2	Your picture on graph paper. Your picture must meet the following criteria:
	● It must have at least 12 curves or line segments
	● There must be at least:
	  ● 2 straight line segments
	  ● 2 parabolas
	  ● 2 cubic curves (or higher degree)
	  ● 1 rational function curve that has at least one asymptote (horizontal or vertical)
	● Your design should be roughly centered at the origin and use all four quadrants
	● Each of the 7 required elements must be labeled with a letter
	
	Before moving on to the next part of the project, get your picture approved by your teacher.	

3	Use the table to show the math used to: ● Convert from expanded form to "apq" form ● Determine the x-intercept(s)	
4	Use the table to show the math to determine the **integer** x-intercepts of your 2 cubic (or higher degree) curves	
5	Use the table to show the math to determine all horizontal and vertical asymptotes of your rational function	
6	A screenshot of your picture created using the Function Art program and colored to look nice	
	A copy of the exact equations with domain restrictions you entered into the Function Art program, e-mailed to your teacher.	
All	**Overall Impression Marks.** To receive full marks your project must: ● Be neat and easy to follow ● Include all required components ● Include the marksheet (this sheet) ● Be enclosed in a duotang or small binder	

Pure Math 20 Quadratic, Polynomial and Nonlinear Functions Project - Picture



Teacher Initial: _____

Math - Parabolas

	First Parabola	Second Parabola
Letter of Parabola		
Defining Equation in the form $y = ax^2 + bx + c$		
Defining Equation in the form $y = a(x - p)^2 + q$ Show your work		
Coordinates of x-intercept(s) Show your work		

Math – Cubic Curves (or higher degree)

	First Curve	Second Curve
Letter of Function		
Defining Equation in expanded form, such as: $y = ax^3 + bx^2 + cx + d$		
Coordinates of **Integer** x-intercept(s) Show your work. If there are no integer x-intercepts, you must **still** show a mathematical justification.		

Math – Rational Function Curve

Letter of Curve	
Equations of **all** horizontal and vertical asymptotes Show all of your work	