CREATING GRAPHIC ART

Background: The digital images that you see on your computer screen are created on a grid that looks just like a standard piece of graph paper except that each box is much smaller. Images are made by putting the appropriate color into the appropriate boxes. What if you wanted all of the boxes that fall inside a circle to be the same color? Wouldn't it be easier to tell the computer to color all the boxes in the circle, rather than to color each one individually? To do that you would have to know the equation of the circle within that grid. This project is going to explore how you can use what you know about equations, inequalities, domain, and range to create art.

Task: What you will be doing in this project is designing a picture using shapes such as lines, circles, parabolas, ellipses, and hyperbolas. Once you have drawn the picture you will shade or color it where appropriate. Then you must list the equations and inequalities, and domain and range restrictions that produce that picture. Your picture must not only be artistic and creative but it must also accurately represent the list of equations, inequalities, domain restrictions, and range restrictions that you have compiled.

Procedures:

1. Throughout the unit pay close attention to the following
2. In your group brainstorm about what type of picture you would like to make
3. Decide what shapes you would need in order to create the picture that you want
4. Draw the picture on a piece (or on a few pieces, if necessary) of graph paper
5. Look at what you have drawn and determine whether or not there may be different shapes that you could add to your picture or some you want to eliminate or change slightly to get the desired effect
6. Determine to equations of your shapes; in some cases you may want to adjust the picture slightly in order to get equations that are easier to work with
7. For each shape decide whether or not the domain and/or range is limited; e.g, if you have drawn a line segment the equation that you determined in #6 must have a limited domain or range to accurately reflect the picture that you have drawn
8. Use the attached form to create the list of equations, and domain and range restrictions that you used to create your picture (Make copies of the blank form before you begin; you, quite possibly, may have more than 15 equations and therefore would need more than one form, having extra copies also allows for mistakes!
9. Prepare a neat, professional-looking copy of the picture you have drawn
10. Look at your picture and decide what parts could use some color or shading
11. Use the attached form to create a list of inequalities and domain and range restrictions that you would use to represent the shaded areas

[Adapted from an NCTM Project and developed by Nicole Leone, Newtown High School]

Equations	Domain Restrictions	Range Restrictions

Inequalities	Domain Restrictions	Range Restrictions	Color

Performance Task Assessment List:

To receive a score of 90% on this project you must meet the following criteria. For each criterion you may receive up to 2 additional points if you were exceedingly thorough or creative or artistic or if you accurately used very difficult shapes. However, for each criterion that you do not meet you may lose up to 10 points.

Criterion	Teacher Assessment	Self Assessment
1. You used a variety of shapes to create your picture		
2. You determined accurate equations for the shapes that you drew		
3. You accurately restricted the domain and the range of the equations		
4. You shaded or colored some portion of your picture and represented it accurately with inequalities and domain and range restrictions		
5. Your finished product is professional looking; it is neat and easy to see as well as artistic and creative		