Name _____Period _____

Purpose: To create a stained glass window divided up by the graphs of the following equations. Please note that you may need to transform your equations by shifting them left, right, up, or down to create an aesthetically pleasing final product. This project will be worth a quiz grade.

Directions: Determine equations to meet the criteria listed below. Accurately plot your equations on attached graph paper, then transfer to large graph paper on a standard 10x10 window. (The small graph is going to be graded so make sure your equations are correctly graphed on the small graph paper. Do not color the small graph.) Color the regions on your large graph in crayon with no more than 5 colors. Cut out your project (to 10x10 size) after you color. Your equations must be your own, but you may help each other.

Linear Functions. Graph at most 4 lines. **Criteria:** 2 lines must be parallel and 2 must be perpendicular. None may be horizontal or vertical. None may have a slope of 1 $(|m| \neq 1)$. (6 points)

Equation 1: _____

Equation 2: _____

Equation 3: _____

Equation 4: _____ (optional)

Absolute Value Function. **Criteria:** The vertex may not be (0, 0). (2 points)

Equation: _____

Quadratic Function. **Criteria:** In $f(x) = a(x-h)^2 + k,\ |a| \neq 1.$ (2 points)

Equation: _____

Cubic Function. **Criteria:** Graph a cubic in the form $f(x) = a(x-h)^3 + k$ and its inverse. Determine the equation for the inverse. Show your work for finding the inverse function. (4 points)

Equation: _____

Inverse: _____

Fourth Degree Function. **Criteria:** The fourth degree function must have exactly 3 integer-value x-intercepts. Local maxima/minima must be visible in a standard window. Use your graphing calculator to calculate local maxima/minima to the nearest hundredth. (2 points)

Equation: _____

Local Maxima: _____ _____ (1-2 points)

Local Minima: _____ _____ (1-2 points)

Square Root Function. **Criteria:** The square root function must not ever be in the first quadrant. (2 points)

Equation: _____

Circle. **Criteria:** The circle must be graphed entirely in quadrant II or IV. (2 points)

Equation: _____

Graph all equations on one standard grid. This paper will be your graded paper. DO NOT COLOR THIS GRAPH.