2. Find the values of D for other parabolas of the form $y = ax^2 + bx + c$, a > 0, with vertices in quadrant 1, intersected by the lines y = x and y = 2x. Consider various values of a, beginning with a = 1. Make conjecture about the value of D for these parabolas.

3. Investigate your conjecture for any real value of a and any placement of the vertex. Refine your conjecture as necessary, and prove it. Maintain the labeling convention used in parts 1 and 2 by having the intersections of the first line to be x_2 and x_3 and the intersections with the second line to be x_1 and x_4 .

4. Does your conjecture hold if the intersecting lines are changed? Modify your conjecture, if necessary, and prove it.

5. Determine whether a similar conjecture can be made for cubic polynomials.

6. Consider whether the conjecture might be modified to include higher order polynomials.

END OF QUESTION

Note:

1. ***The portfolio must be handwritten. Your handwriting must be readable.***
2. ***Please write on one side of the paper; preferable a blank paper.***