Name:_____Date:_____ Period:_____
Birthday Polynomial Project   **DUE 12/10/21**

Objective: To create, characterize, graph, and present a polynomial function that reflects you.

1. Identify **IN ORDER** the digits of the month (1 or 2 digits), day (1 or 2 digits) and year (4 digits) of your birthday. For example, if I were born on June 29, 2002, my ordered birthday digits would be "6292002." (The maximum number of digits you could have is 8, and the minimum number of digits you could have is 6). Record your digits in the space below. **5 points**

2. Create a polynomial using your digits in order. Your digits will be the coefficients of your polynomial. Your polynomial should be in standard form and be at least degree 5. Experiment with the shape of your birthday polynomial by changing the signs and/or exponents of your terms. Try to create a polynomial function with an interesting shape and at least three turning points. Be creative! Find a polynomial having a graph that represents you and write it in the space below. For example, my polynomial *could* be $y = 6x^6 + 2x^5 - 9x^4 + 2x^3 - 0x^2 + 0x - 2$ which would simplify to $y = 6x^6 + 2x^5 - 9x^4 + 2x^3 - 2$. Include both your original and simplified polynomials in the space below. **10 points**

3. Draw the graph of your function with an appropriate and accurate scale on a sheet of graph paper. Be sure to clearly label the *x*-axis and *y*-axis. Your graph must be neat and clean. **15 points**

4. Analyze your polynomial by finding the following characteristics of the graph you have drawn. You must write at least one complete sentence explaining how you found these features OR show the work on how you got the answers (in parentheses after each feature, I have instructions on which to do). Please write your answers below. **45 points**

   a. Domain (explain)

   b. Range (explain)

   c. The y-intercept (show work)

   d. All real zeros (explain calculator steps, should be rounded to the nearest hundredth)

   e. Relative minimums (explain calculator steps, should be rounded to the nearest hundredth)

   f. Relative maximums (explain calculator steps, should be rounded to the nearest hundredth)

   g. Number of turning points (explain)

   h. A description of the end behavior (explain)

   i. The number of real and imaginary roots (explain)

5. Write a self-reflection on this project explaining the process you used to determine your choice of polynomial in #2, the easiest part of the project, the most difficult part of the project and what this project either taught you about the features of a polynomial OR how it reinforced your knowledge about the features of a polynomial. Even though this is for math class, your self-reflection should be a well-organized and well-constructed paragraph, free from grammatical and spelling errors. Your self-reflection should be written neatly or typed on a separate sheet. **25 points**