$\qquad$
Task: 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, I was born on August 13,1985 , so my ordered birthday digits are " 8131985 ." (The most number of digits you could have is 8 , and the least number of digits you could have is 6 ).

Your Birthday: Your Digits:
2. Create a polynomial using your digits in order. Again, for example, my polynomial could be:

$$
y=8 x^{5}-13 x^{4}+x^{3}+9 x^{2}+8 x-5
$$

Your first polynomial:
3. Experiment with the shape of your birthday polynomial by changing the signs of your various terms as well as the grouping of numbers. Try to create a polynomial function with an interesting shape and some turning
points. Part of the fun is playing with the numbers to create something interesting! Be creative!
Your polynomial needs to have the following characteristics:
i. Degree of at least 4.
ii. A real zero

Your final polynomial:
4. Analyze the key features of your polynomial by finding these characteristics:
i. Domain and range
ii. The y-intercept
iii. Academic: All real zeroes and number of complex zeroes

Honors: All real and complex zeroes
iv. Minimums and maximums (Real and Absolute)
v. Increasing and Decreasing intervals
vi. Positive and Negative intervals
vii. A description of the end behavior

As $x$ approaches $-\infty, y$ approaches $\qquad$
As $x$ approaches $\infty, y$ approaches $\qquad$
5. Submit a Desmos Activity (link on course website by teacher/class). Your Desmos activity should include a visual representation of the graph of your polynomial (screen 1) and a written statement of your findings in Part 4, above (screen 2).

| Criteria | $\mathbf{0 - 2}$ pts. | $\mathbf{3 - 5}$ pts. | $\mathbf{6 - 8}$ pts. |
| :---: | :---: | :---: | :---: |
| The accuracy of your <br> polynomial | Polynomial incorrect | Somewhat correct | Completely correct |
| The completeness and <br> accuracy of your analysis | Analysis incorrect | Somewhat correct analysis | Completely correct <br> analysis |
| The accuracy and neatness <br> of your presentation | Presentation not accurate <br> and/or neat | Presentation somewhat <br> accurate and neat | Presentation accurate <br> and neat |

