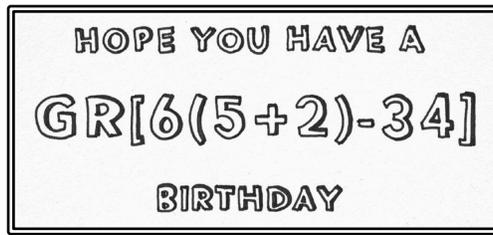


# SM2H – Birthday Polynomial Project



**OBJECTIVE:** To create, characterize and graph a polynomial function that reflects you!

**PROCESS:**

- 1) Write, 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, April 3, 2003 could be 4032003 or 432003. You must use 6, 7 or 8 digits.
- 2) Create a polynomial using your digits as coefficients, in order. Again, for example, my polynomial could be:
  - $f(x) = 4x^6 - 3x^4 + 2x^3 - 3$  ( $f(x) = 4x^6 + 0x^5 - 3x^4 + 2x^3 + 0x^2 + 0x - 3$ ) or
  - $f(x) = -4x^5 + 3x^4 + 2x^3 - 3$  ( $f(x) = -4x^5 + 3x^4 + 2x^3 + 0x^2 + 0x - 3$ )

\*Notice in the first example, the zeros eliminated the 5<sup>th</sup>, 2<sup>nd</sup>, and 1<sup>st</sup> degree terms.
- 3) Experiment with the shape of your birthday polynomial by changing the signs (+/-) of various terms in your calculator. Create a polynomial function with an interesting shape and **at least 2 turning points**. Be creative!
- 4) Analyze your polynomial (using [www.desmos.com](http://www.desmos.com)) by finding these characteristics:
  - Domain and Range
  - x-intercept(s)
  - y-intercept
  - Relative maxima and minima points and values
  - Interval(s) where the function is increasing and decreasing.
  - Interval(s) where the function is positive and negative.
  - End behavior

**PRODUCT:** Use [www.desmos.com](http://www.desmos.com) to accurately graph and label your polynomial. Your project must include a visual representation of the graph of your polynomial (screenshot or exported from Desmos) and should also include the following:

- The statements:
  - My birthday is \_\_\_\_\_.
  - My birthday polynomial is \_\_\_\_\_.
- x-intercept(s) clearly labeled on the graph as ordered pairs.
- y-intercept clearly labeled on the graph as an ordered pair.
- Relative maxima and minima **points** clearly labeled on the graph.
- Identify the interval(s) where the function is increasing, decreasing, positive, and negative.
- Identify the end behavior.

**ASSESSMENT:** This project will be worth **50 TEST POINTS**. You will be graded on completion of all requirements and accuracy of graphs and values.

\*\*The project is due \_\_\_\_\_.

**ABSOLUTELY NO LATE PROJECTS WILL BE ACCEPTED!**

Name: \_\_\_\_\_ Period: \_\_\_\_\_

## SM2H – Birthday Polynomial Project

\*\*Project due \_\_\_\_\_.

**ABSOLUTELY NO LATE PROJECTS WILL BE ACCEPTED!**

My birthday is: \_\_\_\_\_.

My birthday polynomial is: \_\_\_\_\_.

Graph your polynomial on [www.desmos.com](http://www.desmos.com). Print a copy of your graph to turn in with your project. Clearly label the x-intercept(s), y-intercept, and all maxima and minima points.

Complete the following for your birthday polynomial.

1) Domain: \_\_\_\_\_

2) Range: \_\_\_\_\_

3) x-intercept(s): \_\_\_\_\_

4) y-intercept: \_\_\_\_\_

5) Relative maximum point(s): \_\_\_\_\_

6) Relative maximum value(s): \_\_\_\_\_

7) Relative minimum point(s): \_\_\_\_\_

8) Relative minimum value(s): \_\_\_\_\_

9) Interval(s) where the function is increasing: \_\_\_\_\_

10) Interval(s) where the function is decreasing: \_\_\_\_\_

11) Interval(s) where the function is positive: \_\_\_\_\_

12) Interval(s) where the function is negative: \_\_\_\_\_

13) Left end behavior:  $\lim_{x \rightarrow -\infty} f(x) =$  \_\_\_\_\_

14) Right end behavior:  $\lim_{x \rightarrow \infty} f(x) =$  \_\_\_\_\_