

Each of you has a five- or six-digit student ID number. You will use the digits of your ID number to create your own unique polynomial. The digits of your ID number will be the coefficients of the polynomial, in order, with all odd digits having a negative value, and all even digits having a positive value. Here are some examples:

<u>ID #</u>	<u>Polynomial</u>
98654	$-9x^4 + 8x^3 + 6x^2 - 5x + 4$
210543	$2x^5 - x^4 - 5x^2 + 4x - 3$

Attach a separate sheet of paper with the graphs indicated below. Be sure to state the windows that are used for every pictured graph.

Do **not** sketch the graphs by hand. Use the Graph-Link and the Get Screen command (your teacher will demonstrate this) to display these graphs on your final project.

Graphs:

- 1) $P(x)$ Note: You must find one window that shows a complete graph of your polynomial on the TI-89. You will need an additional window **if** the polynomial flattens out around the x-axis and makes it difficult to see how many real roots there are. Most students will only need one window for $P(x)$.
- 2) $P(-x)$
- 3) $|P(x)|$
- 4) $P|x|$

Also answer the following questions. Round answers to the nearest thousandth.

- 1) My polynomial $P(x) =$ _____
- 2) Domain _____ Hint: All polynomial functions have the same domain.
- 3) Range _____
- 4) Degree ____ If $P(x)$ is an odd degree, then the range must be _____.
- 5) Real Roots (x-intercepts) _____
- 6) Y-intercept _____
- 7) Find $P(2) =$ ____ Is your function increasing, decreasing, or neither as it passes through this point? _____
- 8) Find $P(-2) =$ ____ Is your function increasing, decreasing, or neither as it passes through this point? _____

- 9) Is $P(x)$ a one-to-one function? _____
- 10) Find $P(-x) =$ _____
Is $P(x)$ even, odd, or neither? _____
- 11) Find $P(2x) =$ _____
Is this transformation a horizontal stretch or a horizontal shrink? _____
- 12) Solve for x : $P(x) < 5$. Express your answer in interval notation.

- 13) How many solutions will this equation have? $|P(x)| = 10$ _____
- 14) True or False? $P(x)$ will always have the same exact roots as $P(-x)$. _____
- 15) True or False? $P(x)$ will always have the same exact roots as $-P(x)$. _____
- 16) True or False? $P(x)$ will always have the same exact roots as $P(|x|)$. _____
- 17) True or False? $P(x)$ will always have the same exact roots as $|P(x)|$. _____
- 18) True or False? If $P(x)$ is an n^{th} degree polynomial, then it has n Real roots (although some of them may be repeats). _____