**Activity 3.2.4 Polynomial Activity**

Here are all the polynomial functions graphed on Desmos: <https://www.desmos.com/calculator/8y7klvoc8b>

**Part 1:**

**Directions:** Match the given functions (defined by the equations below) with their graphs. Then describe as much as you can about the function using the equation and graph. Features of a graph that should be considered are name of the function, general shape, end behavior, x-intercepts, y-intercepts, and multiplicity of zeros.

**Functions**

y = x3 – 2x2 + x – 12

y = x4 – 16

y = x4 + 2x3 – 11x2 – 12x + 36

y = x3 + 3x2 – 4

y = x3 – 27

y = x3 – 7x2

y = x3 – 7x2 + 12x

y = x3 – x2 + 4x – 4

**Graphs**

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| --- | --- |
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|  |  |
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**Part 2:**

**Directions:** Using the functions from part 1 verify that a solution for the function’s zeros is a solution by using substitution. Then use long division by the factor associated with that solution and the function to make a quadratic. If the function is a cubic you will have to use long division once however if it is a quartic you will need to use it twice. Once you end up with a quadratic factor solve the associated quadratic equation and list all the exact solutions over the Complex Numbers for the zeros of the function.

**Example:**

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| --- | --- |
|  | **Approximate Solutions:** x = -3  **Check:**    **Division:**    **Solve the Quadratic:**  x2 + 1 = 0  x2 = - 1  x = √-1 or -√-1  x = *i* or *-i*  **Exact Zeros:** -3, i and – i |