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| **Standard/Concept** | **“I can…, I know…”** | **Example(s)** |
| Basics/Characteristics of Polynomials | 1. I can determine the general shape of a polynomial graph.
2. I can describe the end behavior of a polynomial graph.
3. I can find the relative maximums and minimums of a polynomial graph.
4. I can determine on which intervals the polynomial graph is increasing and decreasing.
5. Given an equation or a graph, I can determine if the polynomial is even, odd, or neither.
 | 1. Describe the end behavior of the polynomial function.

$$f\left(x\right)=-4x^{5}+3x^{3}-6x^{2}-x+2$$1. Determine whether the following polynomial is even, odd, or neither.

$$f\left(x\right)=3x^{3}-5x+2$$1. a) Sketch a graph of a polynomial that is increasing only on the intervals $(-2, 3)$ and $(7, 9)$.

b) What is a possible degree of the polynomial above?  |
| Long & Synthetic Division | 1. I know that I can always use long division to divide polynomials.
2. I know how to use long division to divide polynomials.
3. I can use synthetic division to divide polynomials by $x-b$, where $b$ is an element of $z$.
 | 1. a) Use long division to divide

 $x^{3}-3x^{2}-5x-25÷(x-5)$.b) Use synthetic division to verify your result from the previous problem. |
| Remainder Theorem | 1. I can use the Remainder Theorem to evaluate a polynomial at a specific value.
 | 1. Use the Remainder Theorem to evaluate $p(-2)$ if

$p\left(x\right)=3x^{4}-x^{3}-2x^{2}+4x-1$. |
| Fundamental Theorem of Algebra | 1. I know that the degree of the polynomial determines the number of roots.
2. I know that the roots can be real and/or complex.
3. I can identify the real roots on a graph.
4. I can use to technology to find exact roots.
 | 1. The graph of the polynomial below has 2 complex roots.

What is the degree of the polynomial?  |
| Zeros | 1. I can find use the rational zero test to state all of the possible rational zeros.
2. I can find the zeros of a polynomial in factored and standard form.
 | 1. What are all of the possible rational zeros of the polynomial

$p\left(x\right)=2x^{3}+x^{2}-13x+6$ ? |
| Polynomial Identities (Factoring) | 1. I can factor a difference of two squares, as well as a perfect square trinomial.
2. I can correctly factor a polynomial using the Rational Zero Test, Long/Synthetic Division, and/or grouping, if necessary.
 | 1. Factor Completely.
2. $25x^{4}-9y^{4}$
3. $x^{3}-3x^{2}+4x-12$
4. $x^{4}-3x^{3}-13x^{2}+51x-36$
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| Multiplicity/Sketching Polynomial Graphs | 1. I can use patterns of multiplicity to determine if the graph will “bounce” or pass through the real zeros.
2. I can sketch a graph of polynomial function putting together what I have learned about finding the zeros, y-intercept, end behavior, multiplicity, etc.
 | 1. a) Find all the zeros of the function $f\left(x\right)=x^{4}-2x^{3}-8x^{2}$.

b) Plot the zeros and y-intercept on the graph. Using what you know about end behavior and multiplicity, sketch a graph of the polynomial. 1. Given that $x=2$ is a zero of the function $f\left(x\right)=x^{3}-3x^{2}+4$, determine its multiplicity.
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