PC 2-2 (Part 1)

Students will write the equation of a polynomial given the roots.

A **Polynomial Function** is a function of the form

$$f(x) = a_n x^n + a_{n-1}x^{n-1} + \cdots + a_1 x + a_0$$

where $a_n, a_{n-1}, \ . \ . \ ., a_1, a_0$ are all real numbers and n is a nonnegative integer. The domain of a polynomial function is the set of all real numbers.

Examples of Polynomial Functions:	Non-Examples of Polynomial Functions:

Example: Form a polynomial function whose real zeros and multiplicity are given. Answers will vary depending on the choice of a leading coefficient.

a) -1 with multiplicity 1
3 with multiplicity 2

b) -1 with multiplicity 1
3 with multiplicity 2
degree 3

Use the roots to write the polynomial in **standard form**.
Roots: -2, 3, 5 Degree: 3

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Roots: $\pm\sqrt{5}$ Degree 2.

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PC 2-2 (Part 2)

Students will write the equation of a polynomial given the imaginary roots.

Complex numbers are numbers of the form:

$$a + bi$$

where a and b are real numbers.

If $z = a + bi$ is a complex number, then its **conjugate**, denoted by $\bar{z}$ is defined as:

$$\bar{z} = \overline{a + bi} = a - bi$$

Fundamental Theorem of Algebra

Every complex polynomial function $f(x)$ of degree $n \geq 1$ has at least one complex zero.

Conjugate Pairs Theorem

Let $f(x)$ be a complex polynomial whose coefficients are real numbers. If $r = a + bi$ is a zero of f, then the complex conjugate $\bar{r} = a = bi$ is also a zero of f.

A polynomial has degree 3 with roots of **5** and $\mathbf{2 + i\sqrt{3}}$. Write the equation of the polynomial in standard form.

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