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Algebra 2

Polynomial Functions Performance Task

Instructions: Choose one performance task. Write all your work on a separate clean piece of paper and attach it to this page.

Big Idea: Function

You can represent quantities using variables and algebraic expressions. You can represent some relationships between quantities using equations.

Performance Task 1

The polynomial $2x^3 + 9x^2 + 4x - 15$ represents the volume in cubic feet of a rectangular holding tank at a fish hatchery. The depth of the tank is $(x - 1)$ feet. The length is 13 feet.

- Use synthetic division to help you factor the volume polynomial. How many linear factors should you look for? What are they?
- Assume the length is the greatest dimension. Which linear factor represents the 13-ft length? What are the dimensions of the tank?
- What is the volume? Do you get the same volume if you substitute the value of x into $2x^3 + 9x^2 + 4x - 15$?

Big Idea: Equivalence

You can use the Binomial Theorem and properties of algebra to rewrite some powers.

Performance Task 2

Show that the following equation is true for all values of a and b .

$$[(a - b) + 1]^5 = a^5 - 5a^4(b - 1) + 10a^3(b - 1)^2 - 10a^2(b - 1)^3 + 5a(b - 1)^4 - (b - 1)^5$$

Big Idea: Solving Equations and Inequalities

A polynomial $P(x)$ of degree n , $n \geq 1$, and its related polynomial function $y = P(x)$ have n complex zeros. The zeros are identical to the n complex roots of the related polynomial equation $P(x) = 0$.

Performance Task 3

All of the following polynomials have two zeros in common. Find these zeros. Use that information to completely factor each polynomial. Then find the real and complex roots of each polynomial. Show all your work.

$$P_1(x) = x^3 - 6x^2 + 11x - 6$$

$$P_2(x) = x^4 - 3x^3 - 7x^2 - 3x + 6$$

$$P_3(x) = 2x^4 - 9x^3 + 6x^2 + 11x - 6$$

$$P_4(x) = x^4 - 6x^3 + 10x^2 - x - 6$$

$$P_5(x) = x^4 - 7x^3 + 17x^2 - 17x + 6$$

Performance Task On Polynomial Functions

Judd E. Hollander



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