

Name: _____ Date: _____ Band: _____
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 Assessment: Analytic Holistic Scoring

Developing Autonomy—The student

3	Persevered to complete the problem without help
2	Completed most of the problem without help
1	Needed key hints to complete the problem
0	Needed extensive guidance to work the problem

The Solution Process—The student's work showed

3	A complete and appropriate solution process
2	An appropriate solution process that is almost complete
1	An appropriate process that is partially complete
0	An inappropriate process or no evidence of a process

The Conclusion/Answer—The student's answer is an

3	Accurate conclusion, supported by valid evidence and reasons, appropriate to this problem and context
2	Inaccurate but logical conclusion, supported by evidence and reasoning but incorrect due to a minor factual error (in details of problem, in computation, recall a formula, etc.) or minor mistake in reasoning
1	Inaccurate but logical conclusion that overlooks, or gets wrong significant facts (about the problem, the rule, computation, etc.)
0	Inappropriate conclusion: not supported by facts and logic, or there is no conclusion

Teacher Comments: