

Show all work to receive partial credit. (18 Points)

1. Using long division simplify each expression:

a) $\frac{2x^3 - 5x^2 - 3x + 6}{x - 2}$ (3 points)

1a. _____

b) $\frac{2x^4 - x^3 - 11x^2 + 14x - 8}{x^2 + 3x - 10}$ (3 points)

1b. _____

2. Using synthetic division to simplify each expression.

a. $\frac{2x^3 - 5x^2 - 3x + 6}{x - 2}$ (3 points)

2a. _____

b. $\frac{3x^4 + 10x^3 + 30x + 3}{x + 4}$ (3 points)

2b. _____

3. Find the zeros of the given equations using completing the square. (3 points)

$$y = x^2 - 4x + 13$$

3. _____

4. Write a cubic polynomial with integer coefficients, if two of its zeros are $\frac{2}{5}$ and $3 - 2i$. (3 points)

4. _____

Polynomial Division

Standard: N.CN.1 - Perform arithmetic operations with complex numbers.

N.CN.7 - Solve quadratic equations with real coefficients that have complex solutions.

N.CN.8 - Extend polynomial identities to the complex numbers. *For example, rewrite $x^2 + 4$ as $(x + 2i)(x - 2i)$.*

A.SSE.1.a - Interpret parts of an expression, such as terms, factors, and coefficients.

F.IF.8 - Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

A.APR.6 - Rewrite simple rational expressions in different forms; write $\frac{a(x)}{b(x)}$ in the form $q(x) + \frac{r(x)}{b(x)}$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or, for the more complicated examples, a computer algebra system.

Task: Students will demonstrate their ability to simplify expressions using long and synthetic division. Students will successfully use completing the square to determine the vertex and zeros of a quadratic. Students will also determine a polynomial equation given imaginary roots.

Criteria:

- Use appropriate operations to simplify/solve expressions
- Use the polynomial identity effectively
- Accurately perform mathematics calculations

Rubric: (for each problem)

Criteria	Done Successfully	Not Done Successfully
Use appropriate operations to simplify/solve expressions		
Use the polynomial identity effectively (Problem #4 only)		
Accurately perform mathematics calculations		