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Polynomial Long Division Worksheet

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Part 1: Foundational Knowledge

What is the term used for the polynomial being divided in a polynomial long division?

Hint: Think about the role of the polynomial in the division process.

◯ A) Divisor
◯ B) Dividend
◯ C) Quotient
◯ D) Remainder

Which of the following are components of polynomial long division? (Select all that apply)

Hint: Consider the different parts involved in the division process.

☐ A) Dividend
☐ B) Multiplier
☐ C) Quotient
☐ D) Remainder

Explain the purpose of polynomial long division in your own words.

Hint: Think about why we use this method in mathematics.

List the steps involved in performing polynomial long division.

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Hint: Consider the sequential process of dividing polynomials.

1. Step 1

2. Step 2

3. Step 3

4. Step 4

What is the degree of the polynomial $3x^4 + 2x^3 - x + 5$?

Hint: Identify the highest power of x in the polynomial.

○ A) 1
○ B) 2
○ C) 3
○ D) 4

Part 2: Application and Analysis

If the polynomial $x^3 + 2x^2 - 5x + 6$ is divided by $x - 1$, what is the first term of the quotient?

Hint: Consider the leading term of the dividend and divisor.

○ A) x^2
○ B) x
○ C) x^3
○ D) x^4

When dividing $2x^3 + 3x^2 - x + 4$ by $x + 2$, which of the following could be the remainder? (Select all that apply)

Hint: Think about the possible outcomes of polynomial division.

☐ A) 0
☐ B) 1

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☐ C) -2
☐ D) 3

Solve the polynomial division x^3 - 4x^2 + 6x - 24 by x - 2 and provide the quotient and remainder.

Hint: Perform the division step by step.

Which of the following best describes the relationship between the divisor and the remainder in polynomial long division?

Hint: Consider the properties of the remainder in relation to the divisor.

○ A) The remainder is always a multiple of the divisor.
○ B) The remainder is always zero.
○ C) The remainder has a degree less than the divisor.
○ D) The remainder is equal to the divisor.

Analyze the division of 3x^3 + x^2 - 2x + 5 by x - 1 and explain why the remainder is not zero.

Hint: Consider the values of the polynomial at the divisor's root.

Part 3: Evaluation and Creation

If the remainder of a polynomial division is zero, what can be concluded about the divisor?

Hint: Think about the relationship between factors and polynomials.

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○ A) The divisor is not a factor of the dividend.
○ B) The divisor is a factor of the dividend.
○ C) The divisor is greater than the dividend.
○ D) The divisor is less than the dividend.

Which of the following scenarios would indicate an error in polynomial long division? (Select all that apply)

Hint: Consider the conditions that would make the division invalid.

☐ A) The degree of the remainder is higher than the divisor.
☐ B) The quotient multiplied by the divisor does not equal the dividend.
☐ C) The remainder is negative.
☐ D) The remainder is a polynomial of degree zero.

Create a real-world scenario where polynomial long division could be applied to solve a problem, and explain how it would be used.

Hint: Think about situations where you might need to divide quantities.

Propose a polynomial division problem and solve it, providing both the quotient and remainder.

Hint: Create a polynomial division problem and work through the solution.

1. Problem

2. Quotient

3. Remainder

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