

# Polynomial Long Division Worksheet Answer Key PDF

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## Part 1: Foundational Knowledge

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

undefined. A) Divisor

**undefined. B) Dividend ✓**

undefined. C) Quotient

undefined. D) Remainder

The polynomial being divided is called the dividend.

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

**undefined. A) Dividend ✓**

undefined. B) Multiplier

**undefined. C) Quotient ✓**

**undefined. D) Remainder ✓**

The components include the dividend, quotient, and remainder.

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

**Polynomial long division is used to divide polynomials and find the quotient and remainder.**

**List the steps involved in performing polynomial long division.**

1. Step 1

**Divide the leading term of the dividend by the leading term of the divisor.**

2. Step 2

**Multiply the entire divisor by the result from Step 1.**

3. Step 3

**Subtract the result from the dividend.**

4. Step 4

**Bring down the next term and repeat.**

The steps include dividing, multiplying, subtract, and bringing down the next term.

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

undefined. A) 1

undefined. B) 2

undefined. C) 3

**undefined. D) 4 ✓**

The degree of the polynomial is 4, which is the highest exponent.

## Part 2: Application and Analysis

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

**undefined. A)  $x^2$  ✓**

undefined. B)  $x$

undefined. C)  $x^3$

undefined. D)  $x^4$

The first term of the quotient is  $x^2$ .

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

**undefined. A) 0 ✓**

**undefined. B) 1 ✓**

**undefined. C) -2 ✓**

**undefined. D) 3 ✓**

The possible remainders could be 0, 1, -2, or 3.

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

The quotient is  $x^2 - 2x + 2$  and the remainder is 0.

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

undefined. A) The remainder is always a multiple of the divisor.

undefined. B) The remainder is always zero.

undefined. C) The remainder has a degree less than the divisor. ✓

undefined. D) The remainder is equal to the divisor.

The remainder has a degree less than the divisor.

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

The remainder is not zero because the polynomial does not equal zero at  $x = 1$ .

### Part 3: Evaluation and Creation

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

undefined. A) The divisor is not a factor of the dividend.

undefined. B) The divisor is a factor of the dividend. ✓

undefined. C) The divisor is greater than the dividend.

undefined. D) The divisor is less than the dividend.

If the remainder is zero, the divisor is a factor of the dividend.

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

undefined. A) The degree of the remainder is higher than the divisor. ✓

undefined. B) The quotient multiplied by the divisor does not equal the dividend. ✓

undefined. C) The remainder is negative.

undefined. D) The remainder is a polynomial of degree zero.

Errors can occur if the degree of the remainder is higher than the divisor or if the multiplication does not equal the dividend.

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

**A real-world scenario could involve dividing resources or quantities represented by polynomials.**

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

1. Problem

**Divide  $4x^3 + 2x^2 - 8$  by  $2x - 2$ .**

2. Quotient

**The quotient is  $2x^2 + 3$ .**

3. Remainder

**The remainder is  $-2$ .**

Provide a polynomial division problem and show the steps to find the quotient and remainder.