



Algebra 1 Workbook

Polynomials

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MATH

ADDING AND SUBTRACTING POLYNOMIALS

- 1. What stays the same when adding and subtracting like terms?

- 2. Simplify the expression.

$$(2x^3 - 5x^2 + x - 3) - (x^2 - 2x + 7)$$

- 3. What went wrong in the following set of steps?

$$6x^3 + 7 + x^2$$

$$7x^3 + 7$$

- 4. What is the coefficient in the following expression?

$$5x^8$$

- 5. Simplify the expression.

$$(10a^2b + 3ab^2 - ab) + (2ab^2 - a^2b + ab)$$

- 6. What is the exponent in the following expression?



$$3z^8$$

- 7. Simplify the expression.

$$(x^4 - 5y^3 + z - xy) - (2y^4 + 6xy - z + x^4)$$

- 8. What is the variable in the following expression?

$$-y^4$$

- 9. What went wrong in the following set of steps?

$$9 - x^3 + 3 + 4x^3$$

$$12 + 3x^6$$



MULTIPLYING POLYNOMIALS

- 1. Expand the expression.

$$(2x - y)^2$$

- 2. What does FOIL stand for?

- 3. What went wrong in the following set of steps?

$$(a - 2)^2$$

$$a^2 - 4$$

- 4. Expand the expression.

$$(3x + 2y)(3x - 2y)$$

- 5. Fill in the blank.

$$(3 - a)(5 + a) = 15 + \underline{\hspace{1cm}} - a^2$$

- 6. Expand the expression.



$$(x^2 - 3)(2 - x)$$

■ 7. What went wrong in the following set of steps?

$$(x - y)(x + y)$$

$$x^2 - 2xy - y^2$$



DIVIDING POLYNOMIALS

- 1. In words, what is the first question you should ask when solving the problem using long division?

$$(2x^2 + 4x - 4) \div (x - 1)$$

- 2. Simplify the expression using polynomial long division.

$$(3x^3 - x^2 + 5) \div (x + 2)$$

- 3. What went wrong in setting up the long division problem?

$$(5x^4 - 3x^2 + x - 2) \div (x^2 + 1)$$

$$5x^4 - 3x^2 + x - 2 \overline{) x^2 + 1}$$

- 4. Given the following long division, write the answer as

$$\text{quotient} + \frac{\text{remainder}}{\text{divisor}}$$



$$\begin{array}{r}
 3x-1 \\
 \hline
 x^2-3 \overline{) 3x^3-x^2+x-5} \\
 \underline{-3x^3} \quad +9x \\
 -x^2+10x-5 \\
 \underline{x^2} \quad -3 \\
 10x-8
 \end{array}$$

- 5. Use long division to simplify the expression.

$$(2x^5 - 3x^3 + x^2 + 4x - 1) \div (x^2 + 2)$$

- 6. How would you rewrite the expression before starting the long division process?

$$(6x^3 - x + 7) \div (x + 1)$$

- 7. Set up but do not solve the following division problem.

$$\begin{array}{r}
 x^5 - x^3 + 4x^2 - x + 6 \\
 \hline
 2x^3 - 5
 \end{array}$$



- 8. Simplify the expression using polynomial long division.

$$(3x^2 + 2x + 5) \div (3x + 5)$$



MULTIPLYING MULTIVARIABLE POLYNOMIALS

- 1. Why can we not add the following two terms?

$$2x^3y + x^3y^2$$

- 2. Simplify the expression.

$$(a - 3y)(2a + y)$$

- 3. What went wrong in the following set of steps?

$$(x + 3b)(-2x - b)$$

$$-2x^2 - bx - 6bx + 3b^3$$

- 4. Simplify the expression.

$$(x - 2y)(x + y) + (3x - y)(4x + 4y)$$

- 5. Fill in the blanks with the correct terms.

$$(5a - b)(7b - 3a)$$

$$35ab - 15a^2 + \underline{\hspace{1cm}} + 3ab$$



$$\underline{\hspace{1cm}} - 15a^2 + \underline{\hspace{1cm}}$$

■ 6. What does FOIL stand for when used in multiplying multivariable polynomials?

■ 7. Fill in the following chart for the multiplication of the following two expressions.

$$(2x - 3y)(x^2 + y)$$

	2x	-3y
x ²		
y		

■ 8. What went wrong in the following set of steps?

$$(a^2 + 6b)(-a - b^2)$$

$$-a^3 - a^2b^2 - 6ab - b^3$$

$$-a^3 - 7ab - b^3$$

■ 9. Fill in the blanks of the multiplication chart with the correct terms when given the following problem.



$$(4a + 3b)(-a + 2b^2)$$

		3b
-a		-3ab

- 10. Simplify the following expression.

$$(5ax - 3by)(a + y) - (a - y)(2ax + 4by)$$

- 11. What went wrong in this set of steps?

$$(-2x)(3y - x^2)$$

$$-6xy - 2x^3$$



DIVIDING MULTIVARIABLE POLYNOMIALS

- 1. Set up but do not solve the long division problem.

$$\frac{y^3 - 3yx^2 + x^3}{y - x}$$

- 2. Find the quotient.

$$\frac{3x^2 + 6xy - 2y^2}{x - 2y}$$

- 3. Given the following long division, identify the quotient, remainder, and divisor.
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$$\begin{array}{r}
 x^2 - xy + y^2 \\
 x+y \overline{) x^3 + 0x^2y + 0xy^2 + y^3} \\
 \underline{-(x^3 + x^2y)} \\
 -x^2y + 0xy^2 \\
 \underline{-(-x^2y - xy^2)} \\
 xy^2 + y^3 \\
 \underline{-(xy^2 + y^3)} \\
 0
 \end{array}$$

- 4. How would you rewrite the expression before starting the long division process?

$$\frac{2y^3 - xy^2 + x^3}{x - y}$$

- 5. Find the quotient.

$$\frac{6x^2 - xy + 2y^2}{2x - y}$$

- 6. In words, what is the first question you should ask when solving this long division problem?



$$2x+3y \overline{) 6x^4 - x^2y + xy^2 + 4y^4}$$

- 7. What went wrong in setting up the long division?

$$\frac{7x^3 + x^2y - 2xy^2 + y^3}{x - 2y}$$

$$7x^3 + x^2y - 2xy^2 + y^3 \overline{) x - 2y}$$

- 8. Fill in the blanks with the correct terms.

$$(2x - y)(\quad) = 6x^2 - 3xy$$

- 9. Find the quotient.

$$(y^2 + xy - 3x^2) \div (y + x)$$



