BOARD NOTES

12 NOVEMBER 2019

2A.7 (B) add, subtract, and multiply polynomials;
2A.7 (C) determine the quotient of a polynomial of degree three and of degree four when divided by a polynomial of degree one and of degree two;
2A.7 (D) determine the linear factors of a polynomial function of degree three and of degree four using algebraic methods;
2A.7 (E) determine linear and quadratic factors of a polynomial expression of degree three and of degree four, including factoring the sum and difference of two cubes and factoring by grouping;

We will be able to determine the factors of trinomial polynomials.

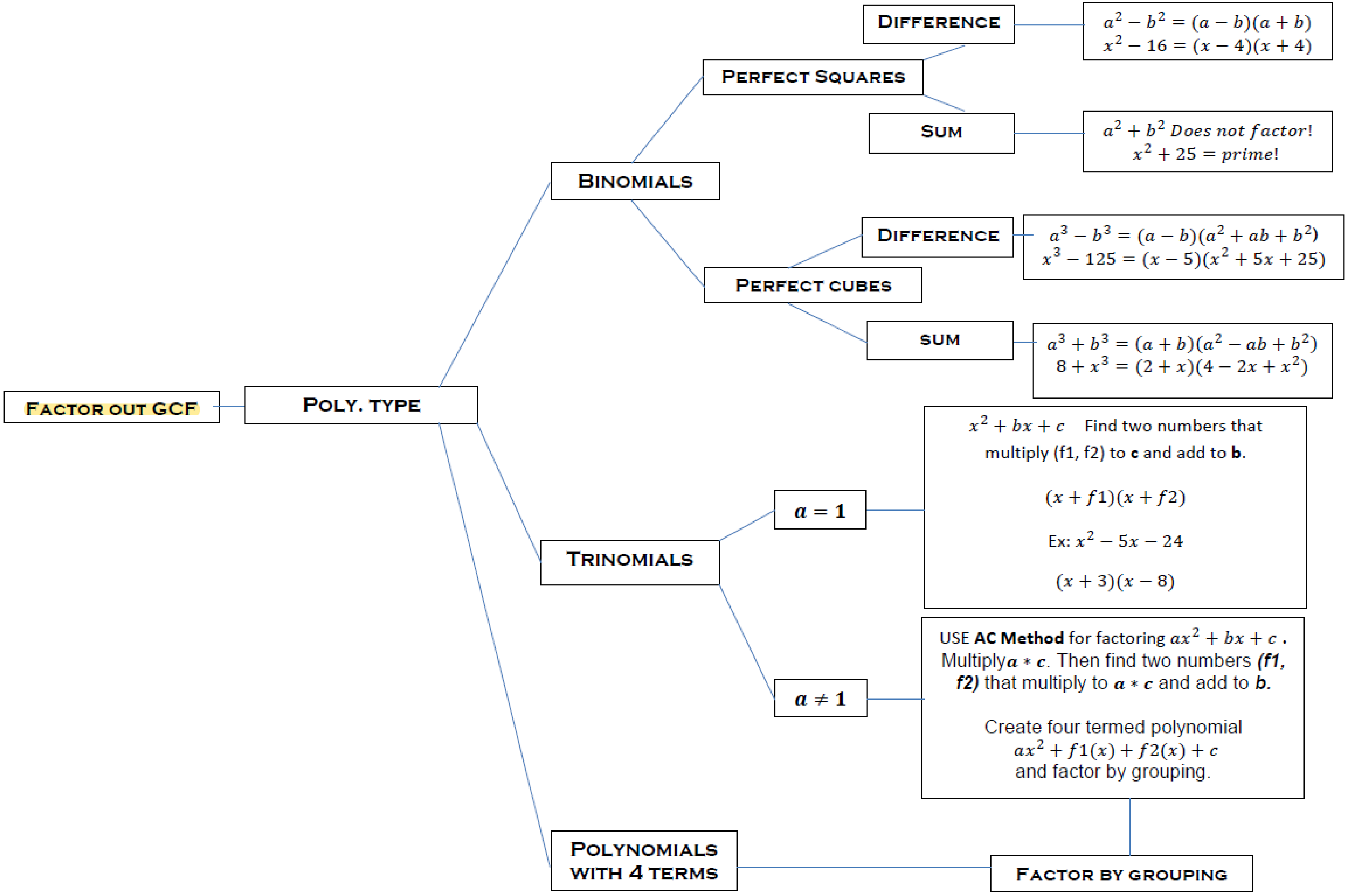
WHAT WE NEED:

- Definition of polynomial
- Laws of Exponents
- Addition and Subtraction of Polys
- Multiplication of Polys
- Division of Polys

I WILL BE ABLE TO COMPLETE MY HOMEWORK GIVEN THE

- Polynomial

FACTORING POLYNOMIALS FLOW CHART



A Strategy for Factoring $ax^2 + bx + c$

Assume, for the moment, that there is no greatest common factor.

1. Find two **F**irst terms whose product is ax^2:

$$(\square x + \quad)(\square x + \quad) = ax^2 + bx + c.$$

2. Find two **L**ast terms whose product is c:

$$(\square x + \square)(\square x + \square) = ax^2 + bx + c.$$

3. By trial and error, perform steps 1 and 2 until the sum of the **O**utside product and **I**nside product is bx:

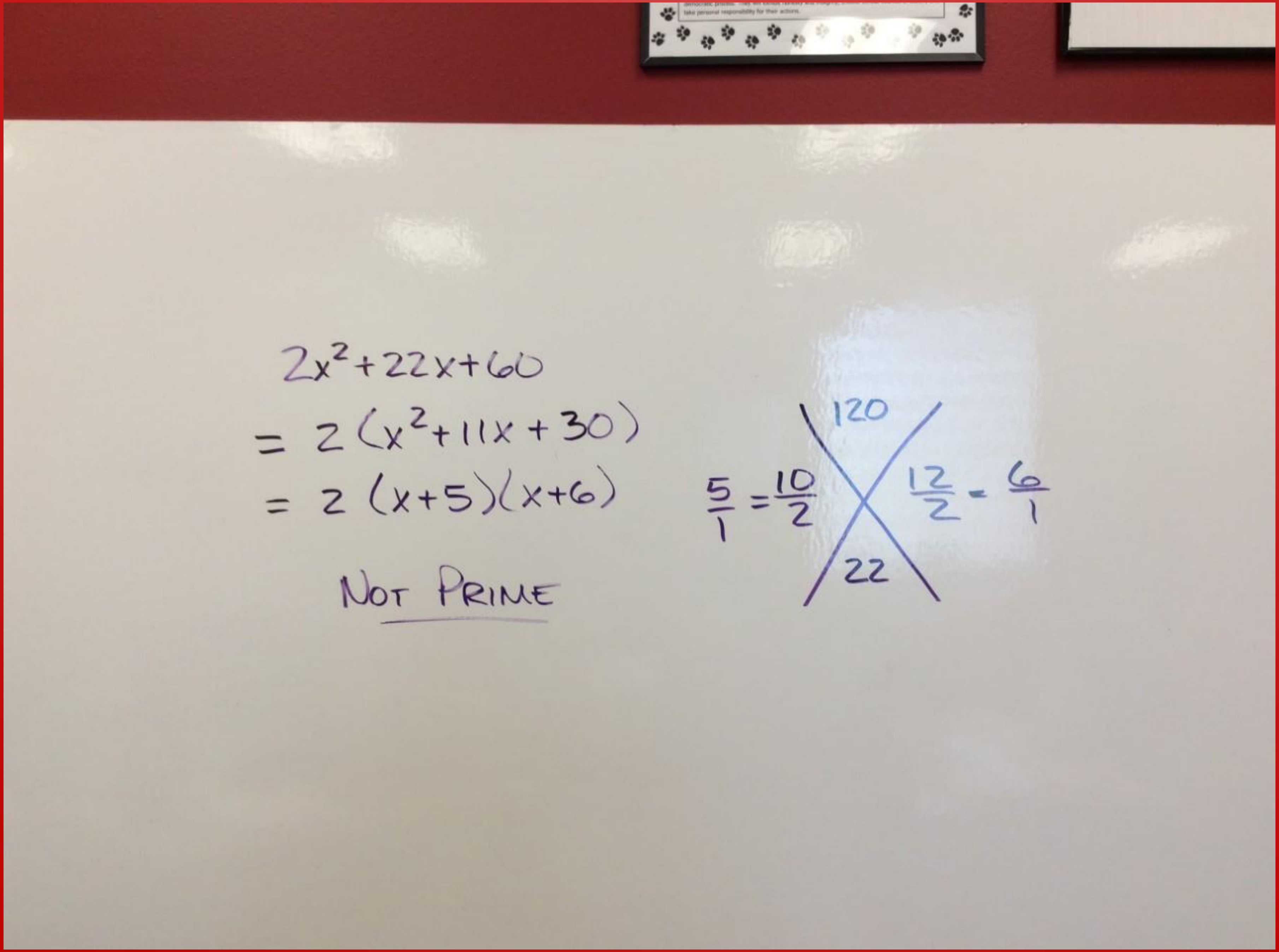
$$(\square x + \square)(\square x + \square) = ax^2 + bx + c.$$

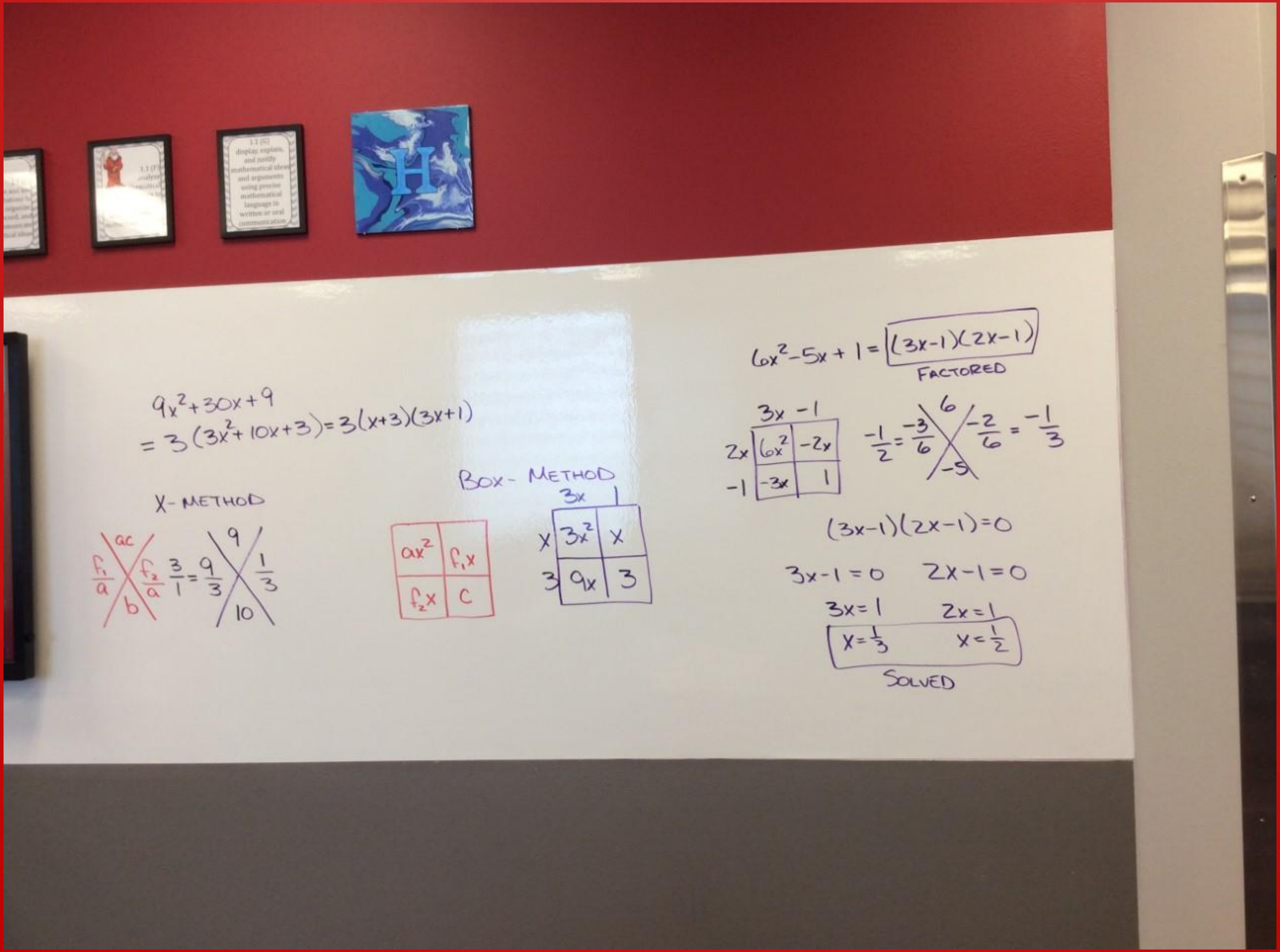
I

O

Sum of O + I

If no such combination exists, the polynomial is prime.


$2x^2+22x+60$
$= 2(x^2+11x+30)$
$= 2(x+5)(x+6)$
NOT PRIME
120
$\frac{5}{1} = \frac{10}{2}$
$\frac{12}{2} = \frac{6}{1}$
22



9x²+30x+9
= 3(3x²+10x+3) = 3(x+3)(3x+1)
X-METHOD
ac
f₁/a
f₂/a
b
3/1 = 9/3
9
1/3
10
BOX-METHOD
ax²
f₁x
f₂x
c
3x
1
x
3x²
x
3
9x
3
6x²−5x+1 = (3x−1)(2x−1)
FACTORED
3x −1
2x
6x²
−2x
−1
−3x
1
−1/2 = −3/6
6
−2/6 = −1/3
−5
(3x−1)(2x−1)=0
3x−1=0
2x−1=0
3x=1
2x=1
x=1/3
x=1/2
SOLVED

$6x^2 - x - 12 = \boxed{(2x-3)(3x+4)}$

$ac = -72$

	$2x$	-3
$3x$	$6x^2$	$-9x$
4	$8x$	-12

$2x^2 + 9x - 18 = (x+6)(2x-3)$

	-36	
$-\frac{3}{2}$		$\frac{12}{2} = \frac{6}{1}$
	9	

$AB = BA$

Factoring Polynomials

Factoring a polynomial expressed as the sum of monomials means finding an equivalent expression that is a product. The goal in factoring a polynomial is to use one or more factoring techniques until each of the polynomial's factors, except possibly for a monomial factor, is prime or irreducible. In this situation, the polynomial is said to be **factored completely**.

Greatest Common Factor

The **greatest common factor**, abbreviated GCF, is an expression of the highest degree that divides each term of the polynomial.

The Difference of Two Squares

If A and B are real numbers, variables, or algebraic expressions, then

$$A^2 - B^2 = (A + B)(A - B).$$

In words: The difference of the squares of two terms factors as the product of a sum and a difference of those terms.

Factoring Perfect Square Trinomials

Let *A* and *B* be real numbers, variables, or algebraic expressions.

1. $A^2 + 2AB + B^2 = (A + B)^2$
2. $A^2 - 2AB + B^2 = (A - B)^2$

Factoring the Sum or Difference of Two Cubes

1. Factoring the Sum of Two Cubes

$$A^3 + B^3 = (A + B)(A^2 - AB + B^2)$$

2. Factoring the Difference of Two Cubes

$$A^3 - B^3 = (A - B)(A^2 + AB + B^2)$$