BOARD NOTES

6 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 special binomial and 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

FACTOR OUT GCF

POLY. TYPE

BINOMIALS

PERFECT SQUARES

DIFFERENCE

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

$x^2 - 16 = (x - 4)(x + 4)$

SUM

$a^2 + b^2$ *Does not factor!*

$x^2 + 25 = prime!$

PERFECT CUBES

DIFFERENCE

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

$x^3 - 125 = (x - 5)(x^2 + 5x + 25)$

SUM

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

$8 + x^3 = (2 + x)(4 - 2x + x^2)$

TRINOMIALS

$a = 1$

$x^2 + bx + c$ Find two numbers that multiply (f1, f2) to **c** and add to **b**.

$(x + f1)(x + f2)$

Ex: $x^2 - 5x - 24$

$(x + 3)(x - 8)$

$a \neq 1$

USE **AC Method** for factoring $ax^2 + bx + c$. Multiply $a * c$. Then find two numbers ***(f1, f2)*** that multiply to $a * c$ and add to ***b***.

Create four termed polynomial
$ax^2 + f1(x) + f2(x) + c$
and factor by grouping.

POLYNOMIALS WITH 4 TERMS

FACTOR BY GROUPING

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

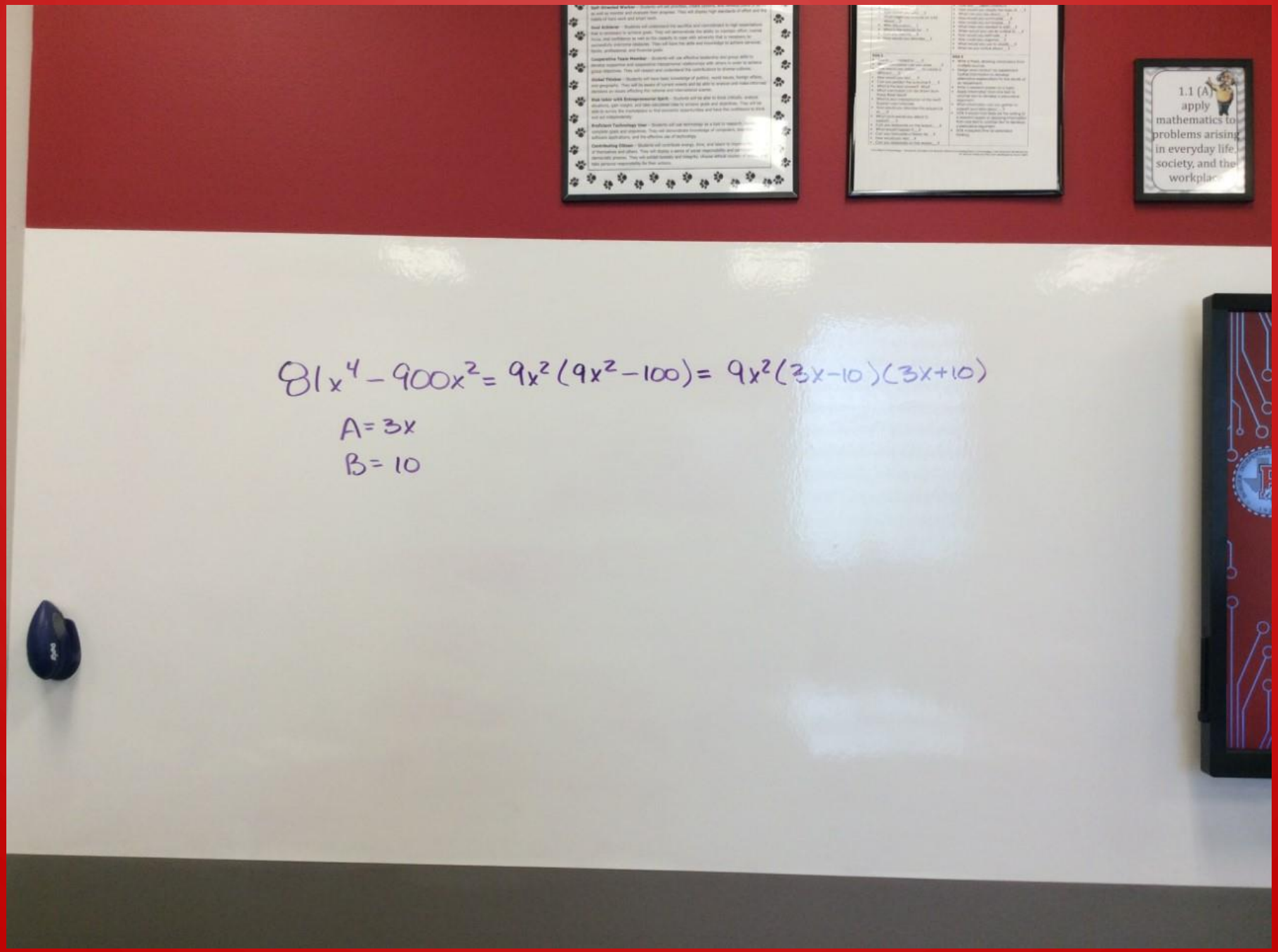
Factoring the Sum or Difference of Two Cubes

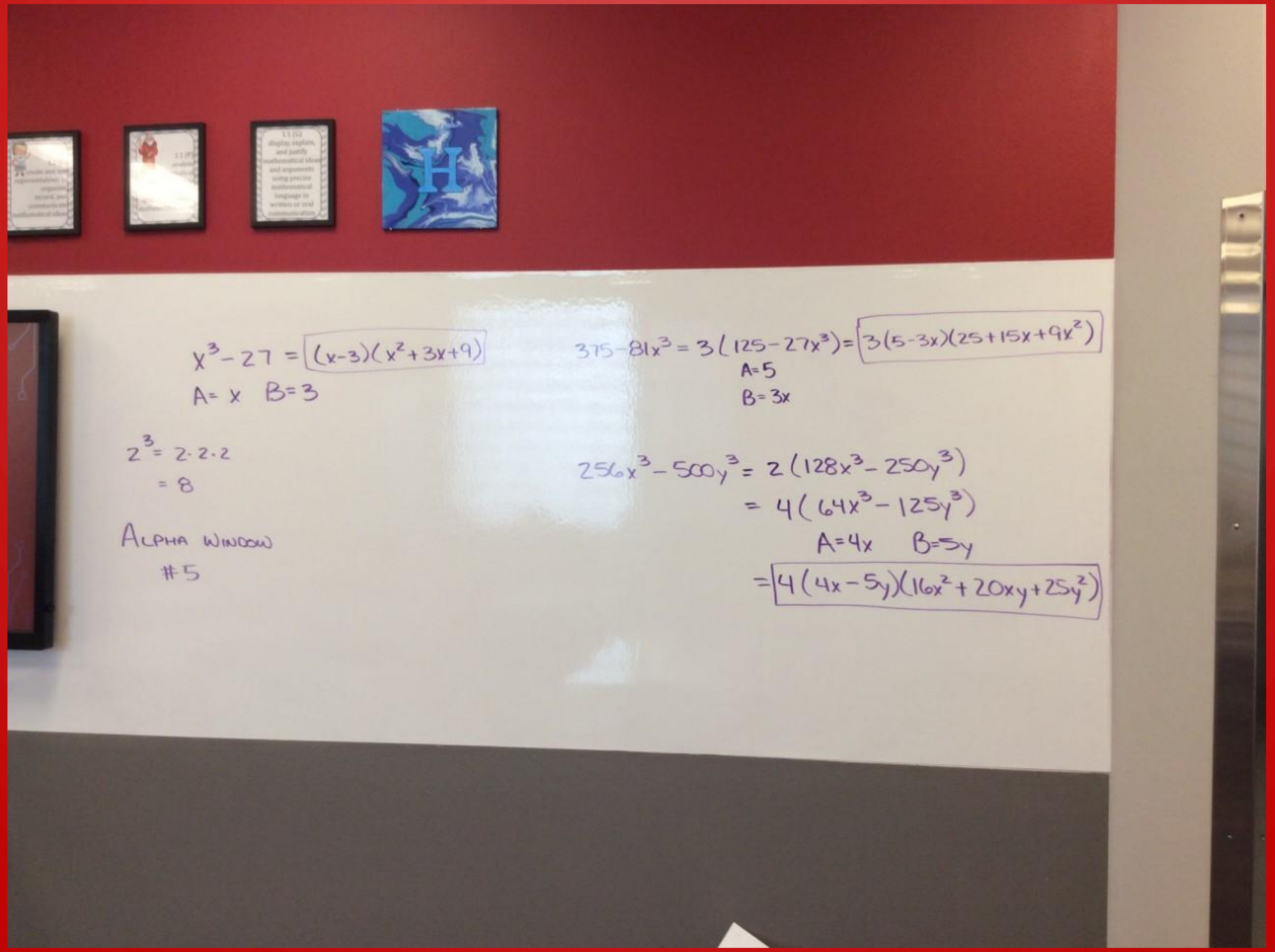
1. Factoring the Sum of Two Cubes

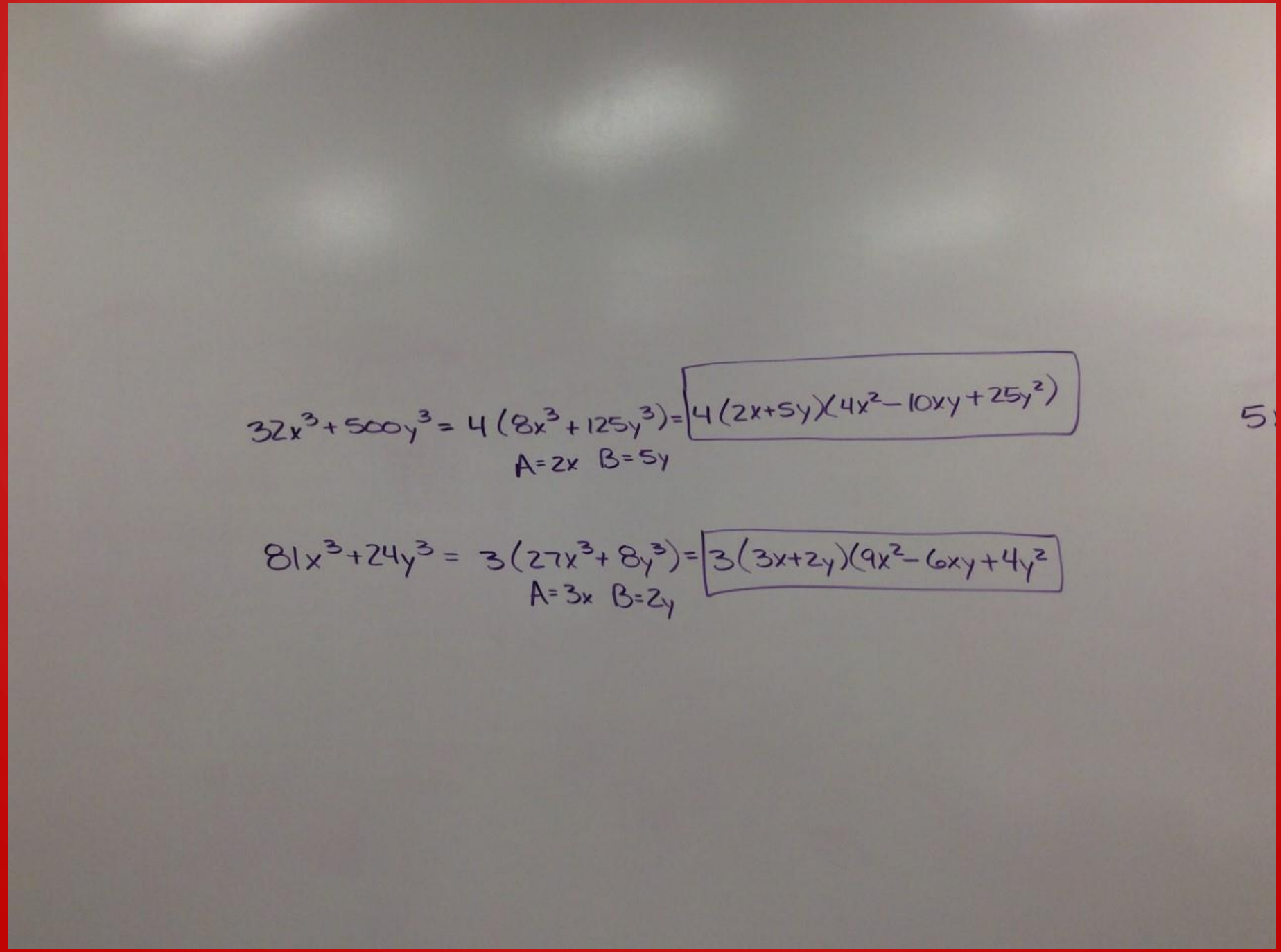
$$A^3 + B^3 = (A + B)(A^2 - AB + B^2)$$

2. Factoring the Difference of Two Cubes

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


$81x^4 - 900x^2 = 9x^2(9x^2 - 100) = 9x^2(3x-10)(3x+10)$
A = 3x
B = 10
1.1 (A) apply mathematics to problems arising in everyday life, society, and the workplac


$x^3 - 27 = (x-3)(x^2+3x+9)$
$A = x \quad B = 3$
$375 - 81x^3 = 3(125 - 27x^3) = 3(5-3x)(25+15x+9x^2)$
$A = 5$
$B = 3x$
$2^3 = 2 \cdot 2 \cdot 2$
$= 8$
$256x^3 - 500y^3 = 2(128x^3 - 250y^3)$
$= 4(64x^3 - 125y^3)$
$A = 4x \quad B = 5y$
$= 4(4x-5y)(16x^2+20xy+25y^2)$
ALPHA WINDOW
#5


$32x^3+500y^3 = 4(8x^3+125y^3) = 4(2x+5y)(4x^2-10xy+25y^2)$
A=2x B=5y
$81x^3+24y^3 = 3(27x^3+8y^3) = 3(3x+2y)(9x^2-6xy+4y^2$
A=3x B=2y

$5x^3 + 81y^3$

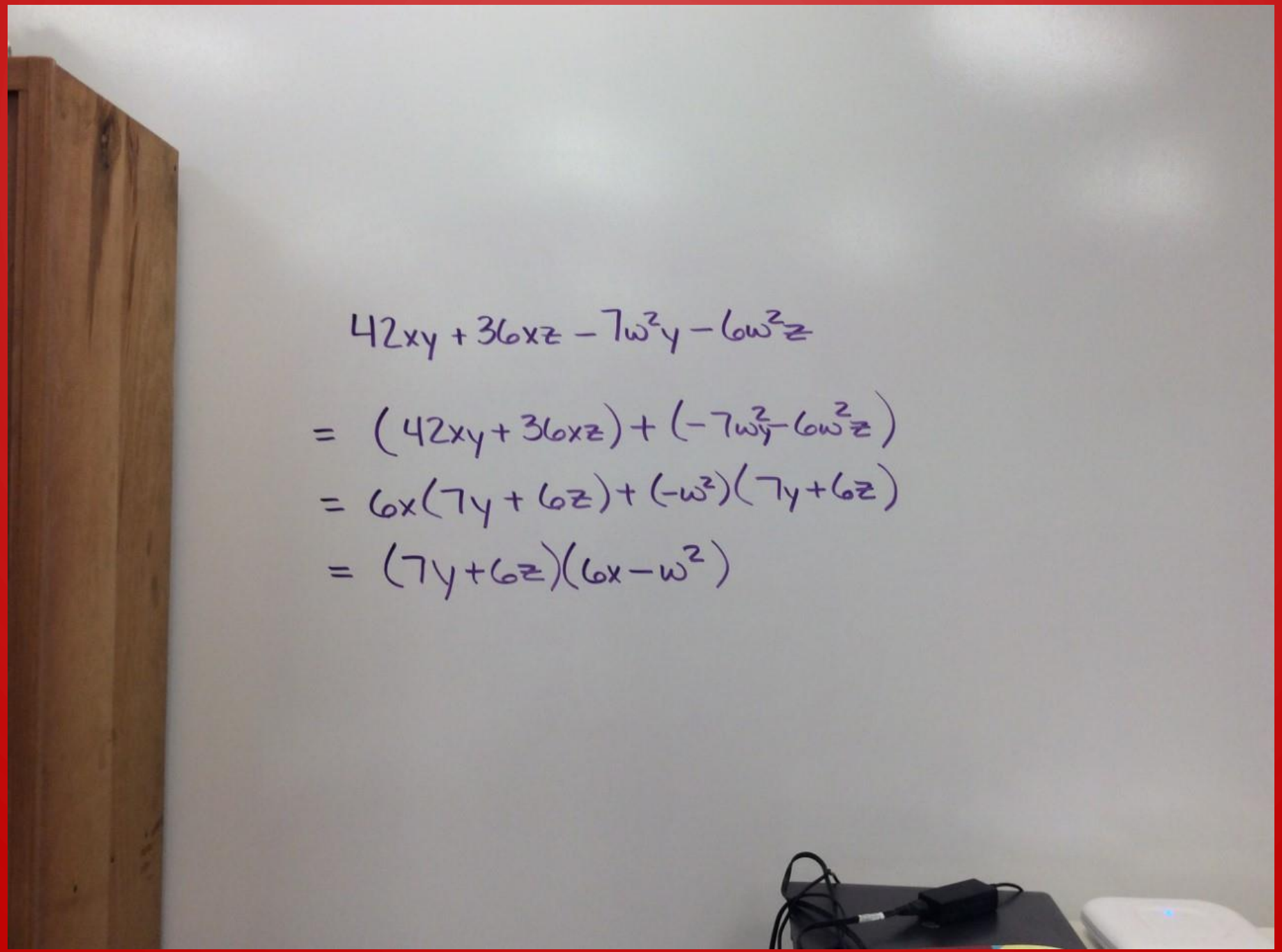
$8x^3 - 64x^2 + x - 8$

$= (8x^3 - 64x^2) + (x - 8)$

① ②

$= 8x^2(x - 8) + 1(x - 8)$

$= \boxed{(x - 8)(8x^2 + 1)}$


$42xy + 36xz - 7w^2y - 6w^2z$
$= (42xy + 36xz) + (-7w^2y - 6w^2z)$
$= 6x(7y + 6z) + (-w^2)(7y + 6z)$
$= (7y + 6z)(6x - w^2)$