BOARD NOTES

1 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;

We will be able to use the remainder and factor theorems to determine if $x - c$ is a factor of $f(x)$.

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

- Function

Division Algorithm for Polynomials

If $f(x)$ and $g(x)$ denote polynomial functions and if $g(x)$ is a polynomial whose degree is greater than zero, then there are unique polynomial functions $q(x)$ and $r(x)$ such that

$$\frac{f(x)}{g(x)} = q(x) + \frac{r(x)}{g(x)} \quad \text{or} \quad f(x) = q(x)g(x) + r(x)$$

dividend quotient divisor remainder

Where $r(x)$ is either the zero polynomial or a polynomial of degree less than that of $g(x)$.

$$
\begin{array}{r}
2x^2 + 3x - 2 \\
x - 3 \overline{)\,2x^3 - 3x^2 - 11x + 7} \\
\underline{-2x^3 + 6x^2} \\
3x^2 - 11x \\
\underline{-3x^2 + 9x} \\
-2x + 7 \\
\underline{2x - 6} \\
1
\end{array}
$$

The quotient is $2x^2 + 3x - 2 + \dfrac{1}{x-3}$.

The Remainder Theorem

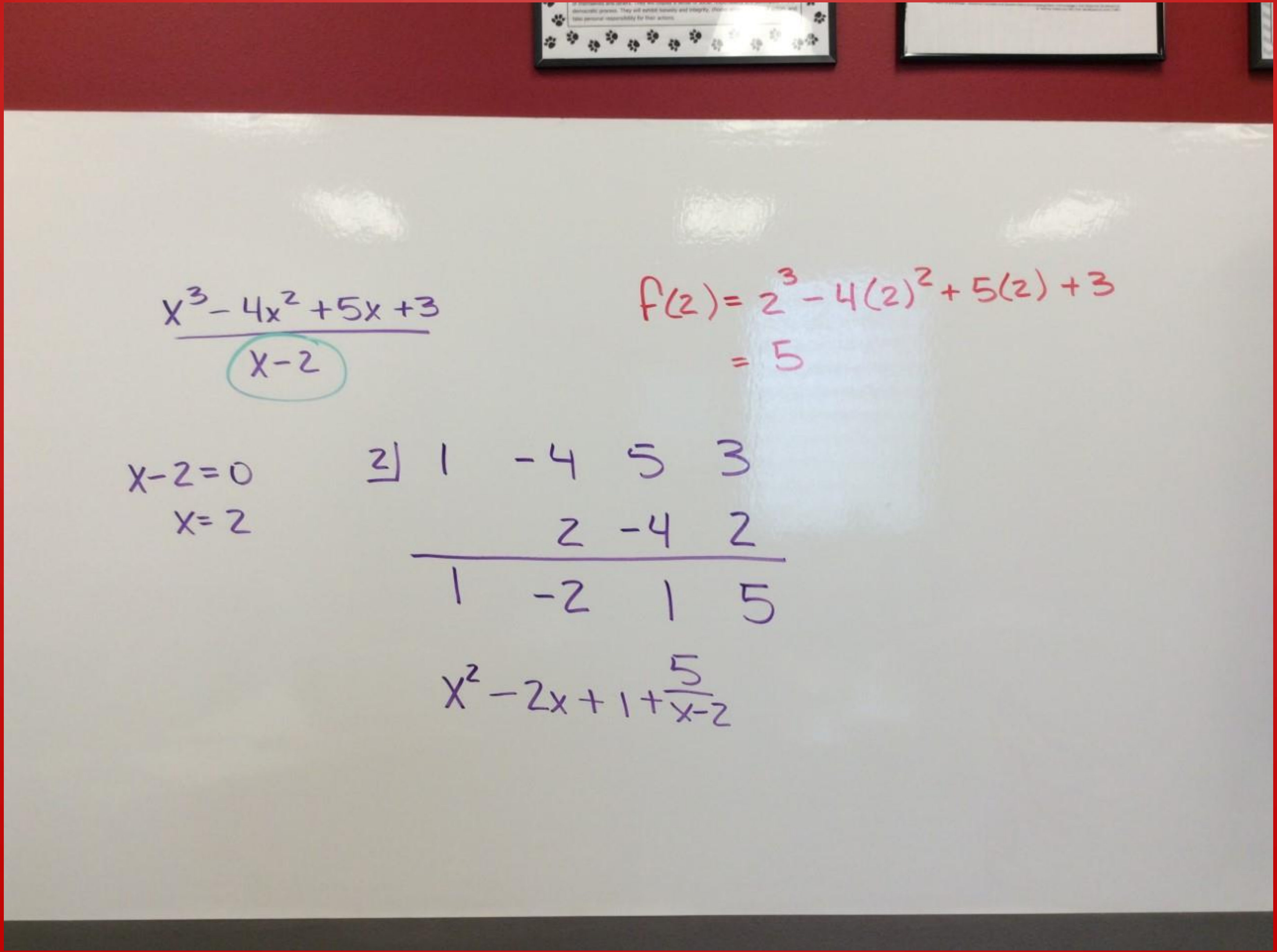
If the polynomial $f(x)$ is divided by $x - c$, then the remainder is $f(c)$.

The Factor Theorem

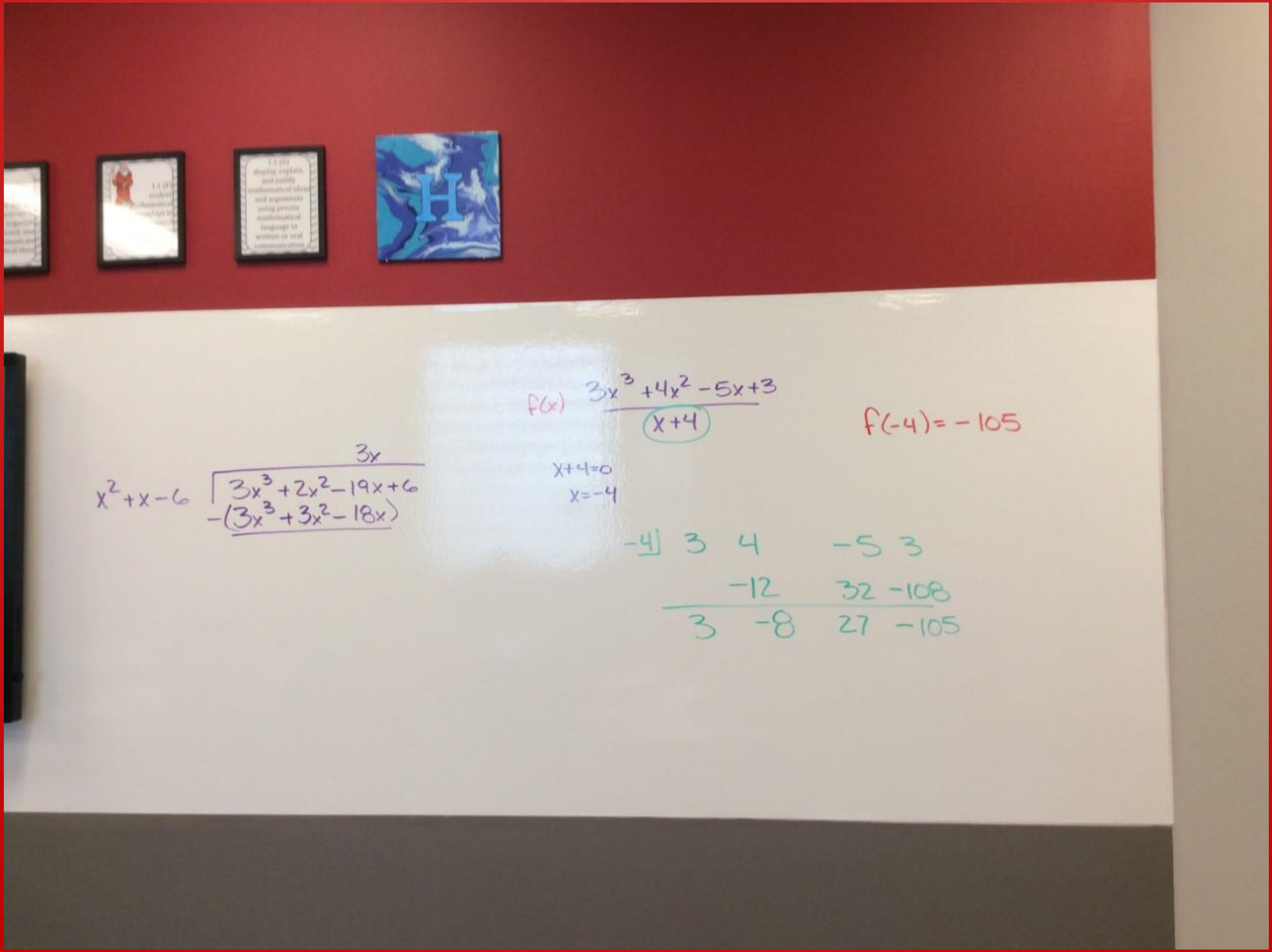
Let $f(x)$ be a polynomial.

a. If $f(c) = 0$, then $x - c$ is a factor of $f(x)$.

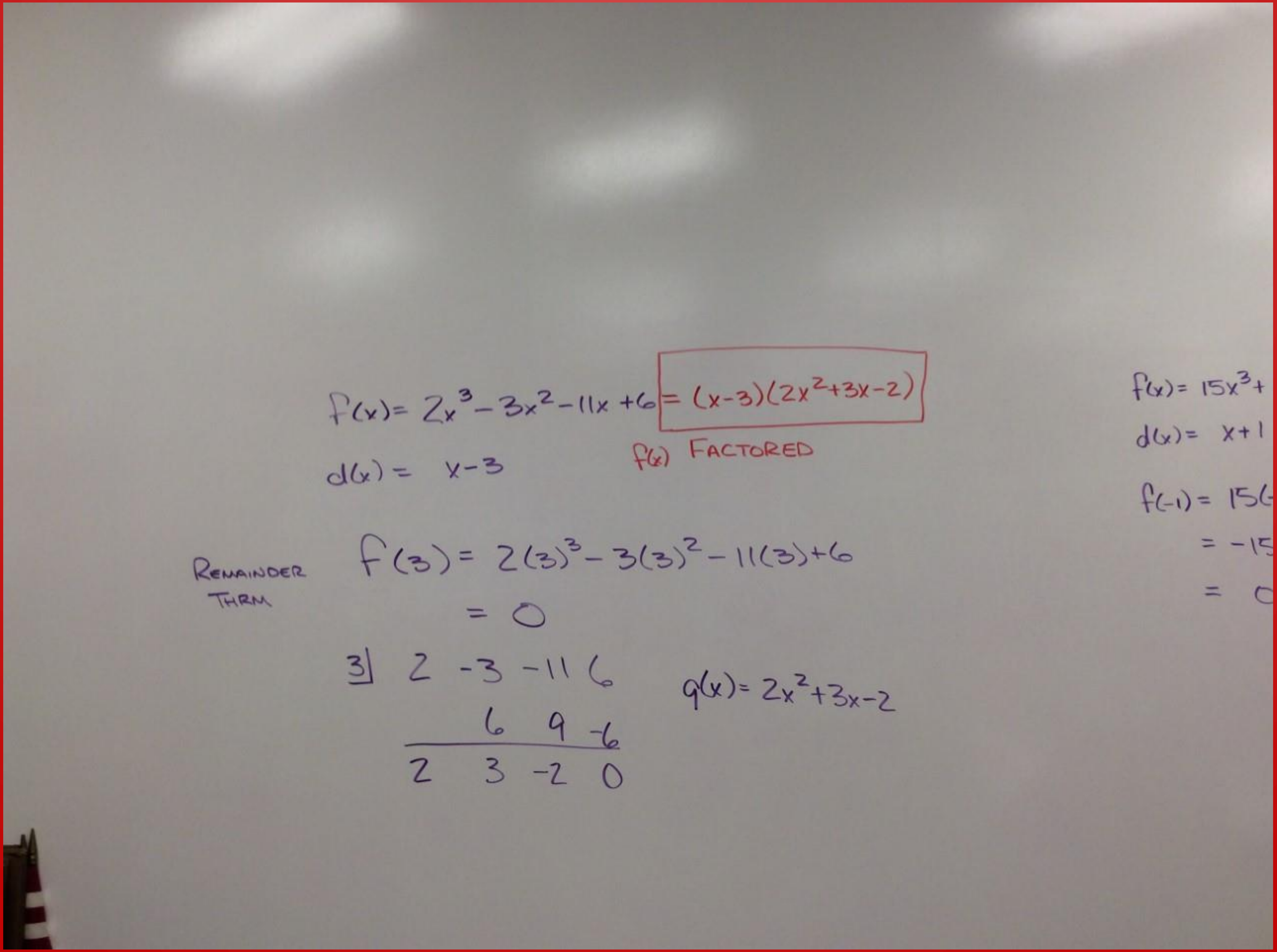
b. If $x - c$ is a factor of $f(x)$, then $f(c) = 0$.



(x³ − 4x² + 5x + 3) / (x − 2)
f(2) = 2³ − 4(2)² + 5(2) + 3
= 5
x − 2 = 0
x = 2
2 | 1 −4 5 3
2 −4 2
1 −2 1 5
x² − 2x + 1 + 5/(x−2)



3x
x2+x−6 | 3x3+2x2−19x+6
−(3x3+3x2−18x)
f(x) 3x3+4x2−5x+3 / (x+4)
f(−4)=−105
x+4=0
x=−4
−4| 3 4 −5 3
−12 32 −108
3 −8 27 −105



f(x)= 2x^3 − 3x^2 − 11x + 6 = (x−3)(2x^2+3x−2)
f(x) FACTORED
d(x) = x−3
REMAINDER THRM
f(3) = 2(3)^3 − 3(3)^2 − 11(3)+6
= 0
3| 2 -3 -11 6
6 9 -6
2 3 -2 0
q(x)= 2x^2+3x−2
f(x)= 15x^3+
d(x)= x+1
f(-1)= 15(

$f(x) = 15x^3 + 14x^2 - 3x - 2$

$d(x) = x + 1$

$f(-1) = 15(-1)^3 + 14(-1)^2 - 3(-1) - 2$

$= -15 + 14 + 3 - 2$

$= 0$

-1	15	14	-3	-2
		-15	1	2
	15	-1	-2	0

$q(x) = 15x^2 - x - 2$