BOARD NOTES

3 MARCH 2020

2A.7 (A) add, subtract, and multiply complex numbers;

We will be able to add, subtract, multiply and divide complex numbers.

WHAT WE NEED:

- TI-84
- Definition of imaginary

I WILL BE ABLE TO COMPLETE MY HOMEWORK GIVEN THE

- Equation

Complex Numbers and Imaginary Numbers

The **imaginary unit** i is defined as

$$i = \sqrt{-1}, \text{ where } i^2 = -1.$$

The set of all numbers in the form

$$a + bi,$$

with real numbers a and b, and i, the imaginary unit, is called the set of **complex numbers.**

The **standard form** of a complex number is

$$a + bi.$$

Operations on Complex Numbers

The form of a complex number $a + bi$ is like the binomial $a + bx$. To add, subtract, and multiply complex numbers, we use the same methods that we use for binomials.

Conjugate of a Complex Number

For the complex number $a + bi$, we define its **complex conjugate** to be $a - bi$.

The product of a complex number and its **conjugate** is a real number.

$$(a+bi)(a-bi) = a(a) + a(-bi) + bi(a) + bi(-bi)$$

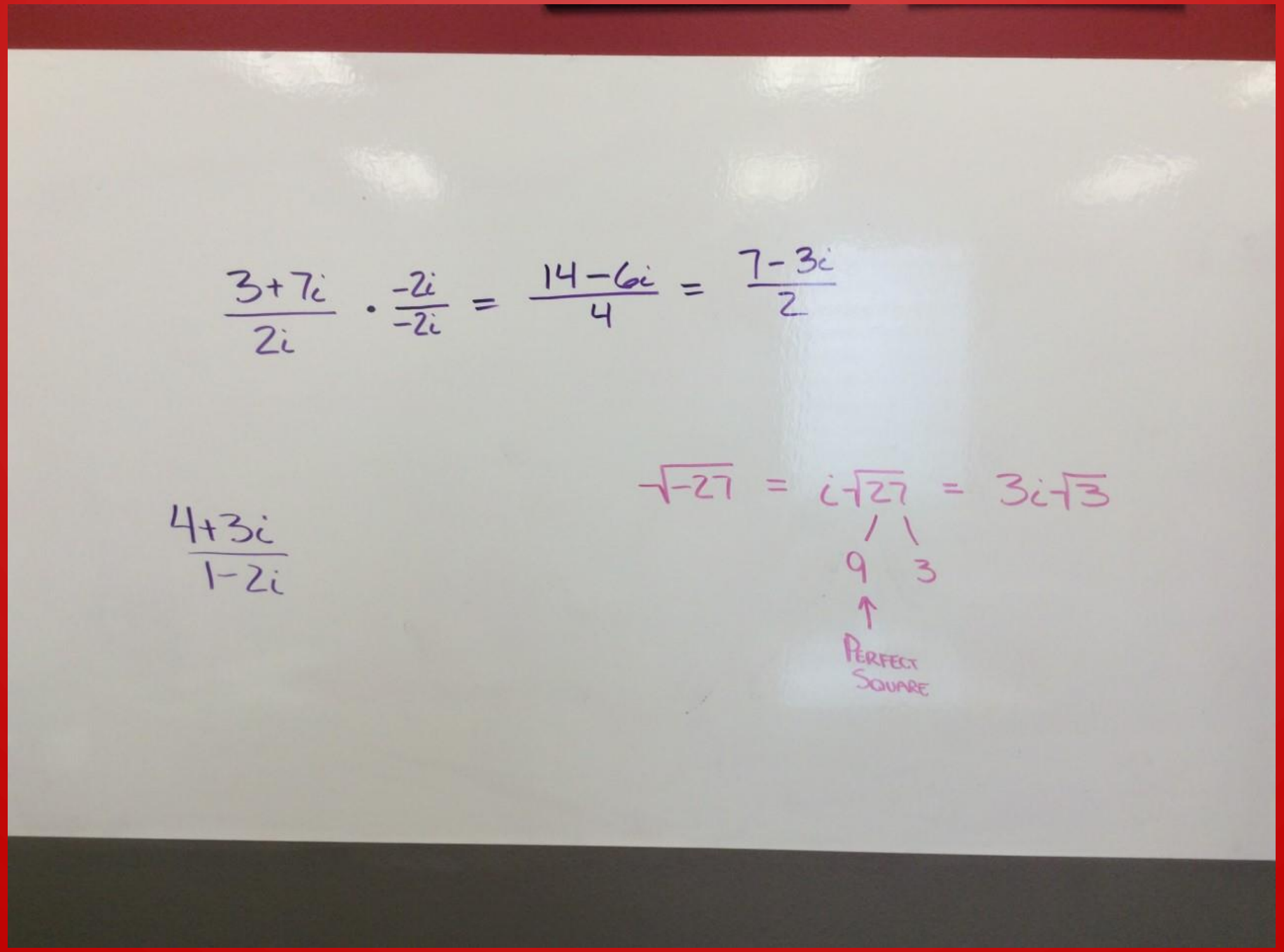
$$= a^2 - abi + abi - b^2 i^2$$

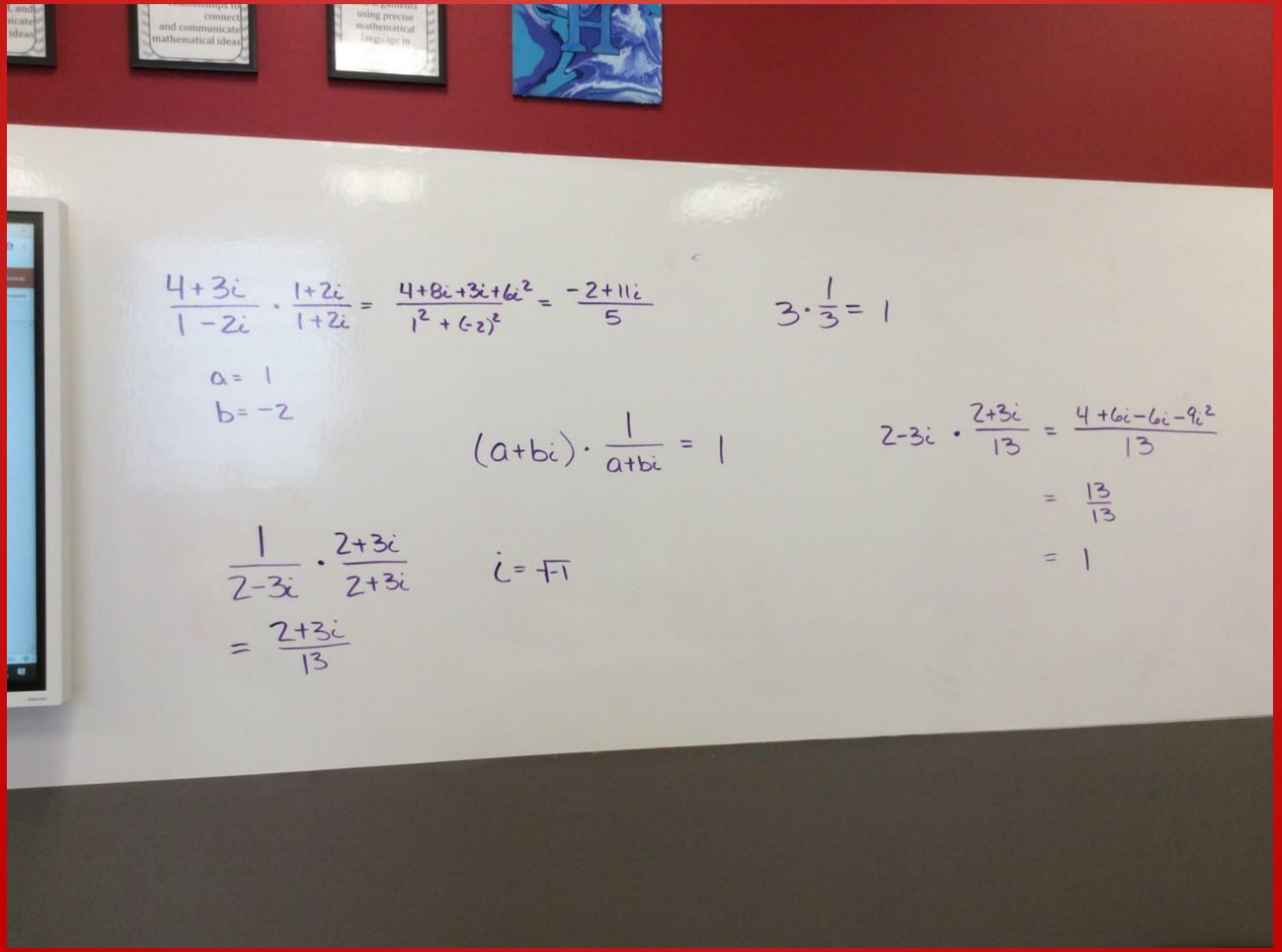
$$= a^2 - b^2(-1)$$

$$= a^2 + b^2$$

Complex Number Division

The goal of complex number division is to obtain a real number in the denominator. We multiply the numerator and denominator of a complex number quotient by the conjugate of the denominator to obtain this real number.


$\frac{3+7i}{2i} \cdot \frac{-2i}{-2i} = \frac{14-6i}{4} = \frac{7-3i}{2}$
$\frac{4+3i}{1-2i}$
$\sqrt{-27} = i\sqrt{27} = 3i\sqrt{3}$
9 3
PERFECT SQUARE


$\frac{4+3i}{1-2i} \cdot \frac{1+2i}{1+2i} = \frac{4+8i+3i+6i^2}{1^2+(-2)^2} = \frac{-2+11i}{5}$
$3 \cdot \frac{1}{3} = 1$
$a = 1$
$b = -2$
$(a+bi) \cdot \frac{1}{a+bi} = 1$
$2-3i \cdot \frac{2+3i}{13} = \frac{4+6i-6i-9i^2}{13}$
$= \frac{13}{13}$
$= 1$
$\frac{1}{2-3i} \cdot \frac{2+3i}{2+3i}$
$i = \sqrt{-1}$
$= \frac{2+3i}{13}$