Lecture 17

* Complex numbers

natural numbers: $1, 2, 3, \dots$

natural numbers plus 0: $0, 1, 2, 3, \dots$

integers: $0, \pm 1, \pm 2, \pm 3, \dots$

rational numbers: $0, \pm \frac{1}{2}, \pm \frac{2}{5} \dots$

real numbers:

complex numbers:

quaternions: $\mathbb{R}^4$

. . . .

$z = a + cb$

↑ real part

↗ imaginary part

Your real part is that you are struggling in the class. Your imaginary part is that you get an A.

Addition: $(1 + 3i) + (-2 - 4i) = -1 - i$

Multiplication: $(1 + 3i)(-2 - 4i) = -2 - 6i - 4i - 12i^2 = 10 - 10i$

(keep in mind that $i^2 = -1$)

Division:
$$\frac{1 + 3i}{-2 - 4i} = \frac{(1 + 3i)(-2 + 4i)}{(-2 - 4i)(-2 + 4i)} = \dots$$

Conjugate: $z = a + bi$, $\bar{z} = a - bi \longrightarrow z\bar{z} = (a + bi)(a - bi) = a^2 + b^2$