2.2 Notes

Wednesday, June 30, 2019 3:12 PM

Real Numbers → Irrational ($\sqrt{2}$, π, 3.1415...) | Rational ($\frac{1}{2}$, -3) | Integers ($\ldots -2, -1, 0, 1, 2 \ldots$) | Whole #'s ($0, 1, 2, 3 \ldots$)

Imaginary Numbers: $i = \sqrt{-1}$ → $i = \sqrt{-1}$, $i^2 = -1$

Complex Number: $a + bi$ (Standard Form)

a = Real Part, bi = Imaginary Part

$3 + 2i$

$-3 + 0i$

$0 - 5i$

ex $\frac{6 + \sqrt{-32}}{2}$

$\sqrt{-32} \rightarrow \sqrt{32}\sqrt{-1} \rightarrow \sqrt{16}\sqrt{2}\, i \rightarrow 4\sqrt{2}\, i$ OR $4i\sqrt{2}$

$\sqrt{32} \rightarrow \sqrt{16}\sqrt{2} \rightarrow 4\sqrt{2}$

PEMDAS

Not Like Terms: $6 + 4x$, $10x$

$\frac{6 + 4\sqrt{2}\, i}{2} \rightarrow \frac{6}{2} + \frac{4\sqrt{2}\, i}{2} \rightarrow 3 + 2\sqrt{2}\, i$ (Real + Imaginary)

$\frac{2+6}{3} \rightarrow \frac{8}{3}$ $\quad \frac{2}{3} + 6 \rightarrow \frac{20}{3}$

- Adding/Subtracting Complex Numbers:

ex $(4 - 7i) + (-5 + 2i) = -1 - 5i$

Imaginary Parts: $-7i + 2i = -5i$

Real Parts: $4 + -5 = -1$

Combine like terms

$(3 + 5i) - (-7 + 6i) = 10 - i$

$5i - 6i = -i$

$3 - (-7) = 10$

$-3x \cdot x$

- Multiplying Complex Numbers:

$(2 - 3i)(4 + i) = 2 \cdot 4 + 2 \cdot i + -3i \cdot 4 + -3i \cdot i$ (F, O, I, L)

$8 + 2i - 12i - 3i^2$

$11 - 10i$

$-3 \cdot -1 \rightarrow +3$

- Division of Complex Numbers: Multiply by the complex conjugate of denominator over itself

ex $\frac{(6 - 3i)}{(5 + 2i)} \cdot \frac{(5 - 2i)}{(5 - 2i)}$ (FOIL)

$\rightarrow \frac{30 - 12i - 15i + 6i^2}{25 - 10i + 10i - 4i^2} \rightarrow \frac{30 - 27i - 6}{25 + 4} \rightarrow \frac{24 - 27i}{29} \rightarrow \frac{24}{29} - \frac{27}{29}i$

$-10i + 10i$ (cancel) $\quad -4i^2 \rightarrow -4 \cdot -1$

$i = \sqrt{-1}$

complex conjugate of denominator $(5 + 2i)$

① Not allowed to have i in denominator

Rationalize

$i = \sqrt{-1}$ of denominator

① Not allowed to have i in denominator

② Complex Conjugate (change middle sign)

$4 - 7i \rightarrow 4 + 7i$

$3 + 8i \rightarrow 3 - 8i$

$(x+5)(x-5) \rightarrow x^2 - 5x + 5x - 25$

$x^2 - 25$

Rationalize

$\frac{4}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$