MATH 1314 – COLLEGE ALGEBRA
SECTION 2.4 COMPLEX NUMBERS

- Imaginary Numbers – based on the imaginary unit i, where $i = \sqrt{-1}$. Note: $i^2 =$

- Complex numbers – numbers that can be written in the form $a+bi$, where a and b are real numbers and $i = \sqrt{-1}$. a is the real part, and b is the imaginary part.

- Simplifying Imaginary numbers – follow the rules of exponents.
  Ex: Simplify (a) $(4i)^2$ (b) $\sqrt{-36}$

- NOTE: If a and b are both negative, then $\sqrt{ab} \neq \sqrt{a}\sqrt{b}$.
  Ex: Simplify $\sqrt{-25}\sqrt{-4}$

- Two complex numbers are equal if their real parts are equal and their imaginary parts are equal.
  $a+bi = c+di$ if $a = c$ and $b = d$.

  Ex: Find the values of x and y if $x+(x+y)i = 3+8i$.

  Ex: Simplify $(5-2i)+(-3+9i)$.

  Ex: Simplify (a) $(3+\sqrt{-36})(7-\sqrt{-16})$ (b) $(5+\sqrt{-16})(5-\sqrt{-16})$

- The complex numbers $a+bi$ and $a-bi$ are _____ of each other.
  In general, $(a+bi)(a-bi) =$

Ex: Divide and write in $a+bi$ form: $\dfrac{3}{2-i}$

Ex: Simplify: $\dfrac{3+\sqrt{-25}}{2-\sqrt{-1}}$

- Powers of i:

Ex: Simplify
(a) i^{43} (b) i^{365} (c) i^{440}

(d) i^{29} (e) i^{18} (f) $\dfrac{3}{i^5}$