

MAT 171 - Section 1.4: Complex Numbers

1: Definition of Complex Number and the Imaginary Unit

The imaginary unit is defined as i , which is equal to $\sqrt{-1}$ where $i^2 = -1$.

Complex numbers is the set of all numbers that can be represented in the **standard form** of $a + bi$ where a and b are real numbers. a is known as the **real part** and b is called the **imaginary part**. A complex number that takes on the form of bi is called a **pure imaginary number**.

The Imaginary Unit Equalities							
$i =$		$i^2 =$		$i^3 =$		$i^4 =$	
Simplify the Following							
$i^{27} =$		$i^{30} =$		$i^{2000} =$		$i^{24} =$	
Simplify and Write the Following Expressions in Standard Form							
$3 + \sqrt{-8}$		$-4i^2 + 2i$					
$(3 + 2i) + (4 - 3i)$		$-3 + 5i) - (-4 + 7i)$					
$-3i(5 - 4i)$		$(1 + 3i)(2 - 5i)$					
$(1 + 3i)(2 - 5i)$		$(2 + 7i)(2 - 7i)$					
$(5 - 2i)^2$		$\frac{3}{4+i}$					
$\frac{5i}{2-i}$		$(5 - 2i) + (3 + 3i)$					
Convert the Following Complex Number to Standard Form, then Simplify							
$5\sqrt{-8} + 3\sqrt{-18}$		$(-2 + \sqrt{-11})^2$					
$\frac{-12+\sqrt{-28}}{32}$		$\sqrt{-12}(\sqrt{-4} - \sqrt{2})$					